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IMPLEMENTATION STUDY

THE CANADIAN CENTRE FOR RESEARCH AND DEVELOPMENT IN LANGUAGE PROCESSING TECHNOLOGY

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I. THE TRANSLATION BUSINESS

A. VOLUME

Translation is big business.

While estimates vary considerably, the total global expenditure on formal translation would appear to be in the $20-25 Billion (U.S.) annual range.

Of this, roughly half ($11.5 Billion) is spent in Western Europe, some $5.5 Billion by Japan and much more modest amounts (perhaps $.5 Billion) in the U.S. and elsewhere. The developing world and Eastern Europe represent additional and significant translation activity and very large numbers of professional translators but do not as yet contribute significantly to overall expenditure estimates because of limited access to convertible currencies and as yet only minor involvement in global trade in translation services.

Recent studies have indicated that the EEC countries translated some 100,000,000 pages per year or roughly 25,000,000,000 words at an average cost of 46 cents a word.

An estimate has Japan translating some 10-13 million pages per annum. (Japan Electronics Industry Development Association--1986).

Estimates have Canadian expenditures on translation in the $250-300,000,000 annual range, comprising some 3,000,000 pages or some 750,000,000 words.

Of this:
-- roughly one third is spent by the Federal Government
-- an additional one sixth is spent by provincial governments (the New Brunswick government translates some 10,000,000 words annually)
-- and the rest is private sector (including Crown Corporations).

The Federal Government currently uses 27cts./word as the approximate inclusive cost of translation. This would correspond to an annual Federal expenditure of $81,000,000 for translation. The Government of New Brunswick indicated that they translated 10,000,000 words per year (for an expenditure of $2.7 million); the Government of Ontario 7,000,000 words; the Government of Quebec 5,000,000; and the other provinces combined total another 5,000,000.

These figures represent only formally designated translations and do not include the large volume of informal or ad hoc translations -- 'rough and ready' translations by amateurs; translations of correspondence or small documents by bilingual authors or support staffs; or the preparation of translation as part of large text creation activities such as project documentation, advertising, personnel documentation and so on.

It should also be noted that there is an additional demand for translation service which is not satisfied because of unavailable resources -- whether because of limited numbers of professional translators or limited funds to support translation. The most frequently cited figure for this "latent" demand is 30% of the total, although it is likely that if the cost of translation were to decline dramatically (as for example, through a breakthrough in Machine Translation) then the amount of material translated would probably increase by greater than 30%.

It is estimated that there are up to 1,000,000 translators worldwide. There are roughly 4,000 professional translators in

Canada and an equal number in the U.S. (exclusive of those working in classified areas who may represent an additional 50% for a total of 6000). Based on the numbers of translators employed in the United Nations Organization, we estimate there to be roughly 4000 translators employed by International Agencies including the UNO, WHO, NATO and so on.

There have been published estimates of some 100,000 translators in the Soviet Union and some 500,000 in China. Neither of these figures is easily verifiable but certainly the Russian figure -- given the range of languages in the Soviet Union -- is not unreasonable.

As for expenditures related to translation support tools, the whole area is relatively young and reliable figures are very difficult to find, if available at all. They will also vary from country to county, being higher in more technologically advanced countries. However, using what is generally known about support tools for white collar employees, and basedon examples from th Government of Canada, Translation Bureau, we estimate those expenditures to be in the order of $2 - $2.5 Billion world-wide and growing, of which some 50% is specifically for computer related tools.

B. PRACTICE

In Canada there are approximately 300 firms with translation services. They employ from one to 40 translators.

Much translation is contracted out to independent translators or to translation companies. In many cases technical translation is kept for in-house staff while marketing or legal translation is contracted out.

The use of computer based technologies in support of translation has for the most part followed a similar absorption pattern as that of technology for the support office work in general. Most knowledge workers, translators included, are currently using computers and some are using highly specialized software applications. Initially there was the use of computers as conventional powerful type writing machines and then as 'word' processors. This was followed by a host of more specialized applications and increasingly the use of internal networks and larger scale centralized storage for integrating the work of individualized translators and of the translation function with other elements of text production in the organization.

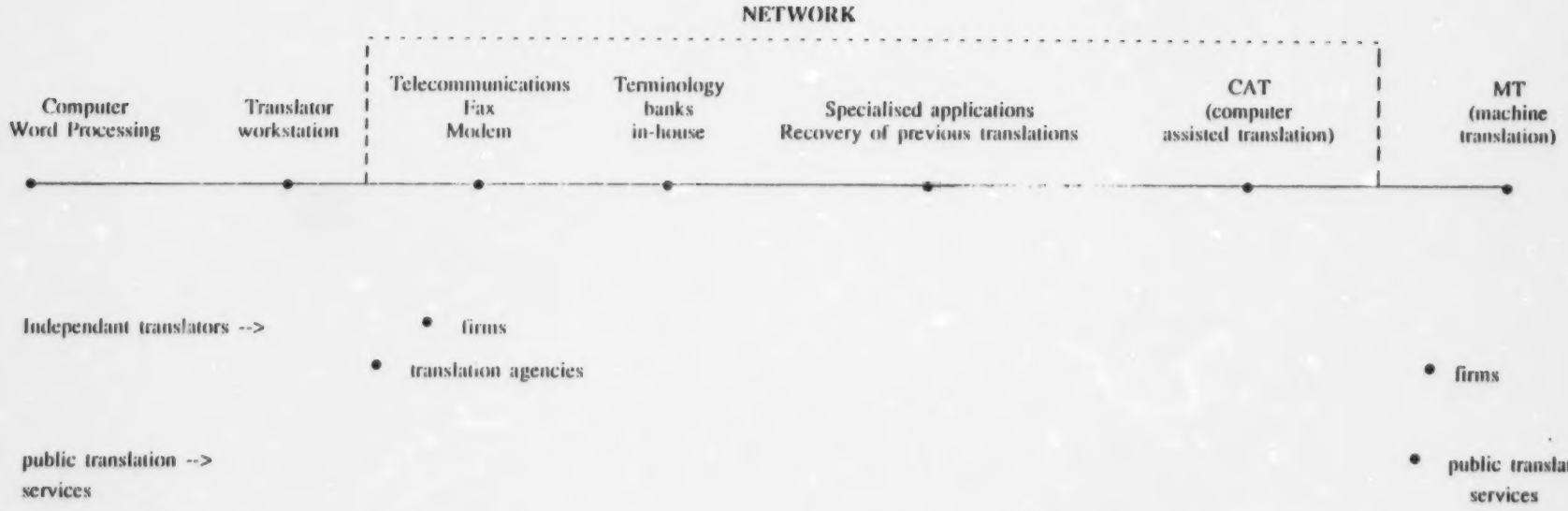
These office tools and software designed specifically for translators constitute a spectrum of technological options for translators ranging from dedicated word proccessors all the way to fully automated translation.

In figure 1 we can see the full spectrum of automated technologies supporting translation. It is possible to locate virtually all translators in advanced countries somewhere on this spectrum in terms of their current adoption and use of technology. It might also be noted that there is a migration over time along this spectrum, both for individual translators and for translation units as they become more comfortable in using translation support tools (traductique) and as they make the investment required to move

FIGURE 1

TECHNOLOGY SPECTRUM

TECHNOLOGIES



TRANSLATORS

towards increased automation. The continuing decrease in cost and increase in efficiency of particular technologies also promotes migration from the left to the right side of the spectrum.

At the low end of the spectrum we find independant translators. As translators are regrouped in working units in agencies, firms or the governments they have access to more software to support private sector through the development of specialized software or simply ad hoc means for exploiting previous translations.
The Federal Government is located at both ends of the spectrum.

The most promising area, especially in the achievement of productivity gains in the short term, is in the middle of the spectrum where significant gains may be achieved through the use of advanced language processing technologies, especially those allowing for the exploitation of the capital of existing translations. In this area significant financial returns can be achieved without incurring the heavy investments required for fully automated machine translation. While most translators are currently on the left side of the spectrum, there are significant commercial opportunities for hardware, software and service suppliers as translators move to the centre of the spectrum to achieve efficiency improvement.

The current norm for Federal Government translation is 1500 words/day. The actual output however, varies greatly depending on the skill and experience of the translator, the difficulty of the text and other factors. Output has been increased by twenty to forty percent as a result of the use of word processing and other computer based translator supports. Output has been found to be further increased (in some cases doubled) by using machine translation (MT) in those areas where its application is appropriate. Output was found to have tripled at one site in the insurance sector where machine assisted translation was applied in the partial translation of repetitious "standard documentation".

C. TRENDS

Studies, including the Van Slype report (OECD), recent EEC studies and the Cognos report have suggested that a 10% increase per annum in translation (after inflation) may be assumed.

The greatest factor pushing translation activity is the increased globablization of business. The attempt by even medium and small companies to compete in global markets increases dramatically the requirement for multilingual documentation and product labelling both for marketing and regulatory purposes. This in turn will direct the types of translation services and specialities which will be required, with a greater emphasis on technical and marketing oriented translation.

Two other broad trends might be noted. Alongside the rise of English (primarily) as the global trading language, and the use of other European/colonial languages as national 'lingua francas' is the developing concern among Less Developed Countries for the use of pre-colonial languages and thus the translation of materials into these languages. In practise, in many cases the teaching and thus popular use of the colonial languages is declining and the need for educational, legal and economic development related materials in non-colonial languages is rapidly increasing. This represents a significant market for translation support although the difficulties of 'computerization' in many of these environments may act as an on-going impediment to its applications.

The second broad trend is for the retention and even revivification of dormant or otherwise peripheral languages. The ease of communication with electronic media at least through radio and video has led to a renewed or on-going interest in these languages if only in their oral form -- whether this leads to increased demands for their use in printed materials remains to be seen. In

the Canadian context the desire on the part of the new government of the Eastern North West Territories to be officially tri-lingual would lead to all official text being translated into at least one of the native languages. It is developments of this kind which will continue to push the demand for translation.

Finally, there will also be an increase in the demand for translation in the EEC countries as the EEC expands and as it moves toward economic integration in 1992. The collapse of the Warsaw Pact has expanded interest in translation between Western European and Eastern European languages.

Trends in the broad area of translation support technology are difficult to assess due to the infancy of the industry. Growth in the office oriented computer market is currently in a broad holding pattern (except for certain specific pieces of equipment such as laptop computers) reflecting the downturn in the Western economies. There will of course, continue to be a very large market for TST as those currently lagging in this area are required to make the investment to catch up, with an expected growth of at least 10% yearly.

The next step in technology development for TST is to translator oriented software, optical character recognition (for text input), on-line text storage and so on. However, in the short run, productivity gains are as likely to arise from a more widespread use of existing technologies as they are to come from the introduction of new technologies.

The push in the TST marketplace is expected to come from two sources--from the need for handling multi-lingual translation activities in support of global product marketing and from the availability of lower cost translation support for non-professional translators.

In the first instance the prospect of a North American common market will dramatically increase the demand for tri-lingual translation among Canadian businesses. Technology in support of this is expected to experience considerable demand.

In the second instance, globalization in a wide range of commercial and other areas combined with the coming on the market of relatively low cost hardware and software is expected to increase dramatically the demand for translation support tools among casual translators or non-professional occasional translators. A typical example of this type of translation would be a secretary translating a document from a source language for the use of her boss, or alternatively translating an outgoing letter from a source language to a second language of which she is a native speaker (an informal aspect of the job description of many support staff in Ottawa, for example). In either case a significant proportion of the entire installed base of personal computers would be a market for 'personal translation support tools', if these tools can be made sufficiently easy to use, effective and low cost. Bi-lingual dictionaries are a first step in this direction but bi-textual translators, grammar checks and so on represent a very significant potential market.

An additional trend is for the integration of translation into the broader text flow and text management processes of an agency. In this context translation is but one (although in many instances a highly significant or even necessary) element in text production where the use of desktop publishing software makes the text, once translated, directly available for reproduction and distribution in both its original and translated forms.

II THE TECHNOLOGY DIMENSION

A. APPLICATIONS

I. FULLY AUTOMATIC MACHINE TRANSLATION (FAMT)

1.1 Fully Automatic Machine Translation in Canada

Some, including many professional translators, are still skeptical towards Fully Automatic Machine Translation (FAMT), pointing out how few successes it seems to have had so far and how high the development costs have proven. In Canada FAMT is gaining ground very slowly, nevertheless it is now irreversibly established.

The principal Canadian FAMT installations are the following:

* METEO 2 at Environment Canada, the latest development from the famous TAUM-METEO prototype, now French to English as well as English to French;

* FoG at Environment Canada, a so far unique case of bilingual text generation from non-linguistic data input (see below);

* SMART at Employment & Immigration Canada, a proof that poor-quality output can be put to use even in documentation for the general public;

* SYSTRAN at General Motors of Canada, the only Canadian installation of what has been, commercially speaking, the most successful of all MT products;

* LOGOS at Lexi-tech (Moncton) and at several locations in the Translation Bureau of the Secretary of State, a general purpose second generation system;

and * LE ROUTIER at CLC for Canada Post Corporation, like METEO a convincing example of the strategy of building a system dedicated to a very specific technical sublanguage.

A measure of the slow pace is that four of these six systems are developments from prototypes that are 15 years or more old.

1.2 FAMT abroad

Abroad, the spread of FAMT has been faster than in Canada. For example SYSTRAN is well-established at several locations in Europe (at the EEC in the public sector, through Gachot S.A. in the private sector), with the Siemens' system METAL now a serious competitor. Whereas the Western European operational systems are mostly American designed (even METAL), the Russians, Japanese and Chinese now all have their own systems operational or (in the Chinese case) nearly so. Yet there too, most of the systems currently operational are based on the technology of the 1960's and 1970's.

1.3 Cost of FAMT

The cost of FAMT, is coming down as the market expands, as the initial development cost of the systems is amortized, and as the hardware required to run the systems becomes ever more miniaturized. Whereas the prototype of METEO needed a large mainframe computer, METEO 2 and several other systems now run on mini-computers and even micros. At the extreme low end, the software for some of the simple (some would say rather crude systems) e.g. PC-TRANSLATOR, can be bought for a few hundred dollars; and even a system sophisticated enough to be used for professional translations, TSS, now sells for $15,000. However,

the high end of the range (e.g. LOGOS renting at a minimum of $2,000 a month) is still perceived by most translation service managers as too expensive.

1.4 Technological breakthroughs in FAMT

Meanwhile two technological advances are discernable which could change the outlook for FAMT:

* The simultaneous generation of texts in two or more languages from non-linguistic (i.e. graphic or statistical) data. Though the applications of this technique may be more limited than that of conventional MT, it is very attractive because its potential for speeding up the production of documents is even greater.

It advances us to a situation where it is no longer necessary--as in the conventional translation chain--to wait until a document has been finalized in one language before starting to produce it in another language. This is an advantage that will be even more appreciated in the EEC with its nine official languages, than in Canada. (This promises to be the more immediately useful of the two advances since there is already a fully operational implementation of it, namely FoG.)

* Speech recognition. Besides adding the spectacular possibility of oral 'machine interpretation' to written machine translation, effective speech recognition would enable experienced translators to return to dictating their texts instead of typing them. Though speech recognition has already made its appearance in FAMT research laboratories in Canada and around the world, it is unlikely to be usable in practical FAMT systems before the second half of the decade.

The use of FAMT is an thus an established reality and the long-term outlook is promising. Nevertheless the number of users remains small, above all because these current systems require a long run-in and fine-tuning period lasting one to three years and using highly qualified staff. Hence they are currently only suitable for the translation services of large organizations with a continuous flow of long texts in a specific sublanguage, the will to persist in spite of initial difficulties, and ample financing as well as the patience to wait a long time to amortize the investment -- or indeed a willingness to write off part of the cost for ulterior reasons. Another numerically small market for FAMT exists in the form of translation agencies that do not sell a system as such but use it in-house to speed up the translation service they are offering.

On the other hand, if a sale is made of an FAMT system, it is for a relatively large amount; and in addition rental and add-on income will likely continue for years because the client is 'locked in' to the system.

The Canadian market is still largely supplied by the American pioneers. There are only four relatively small Canadian builders of FAMT systems whose products are already operational, viz. CLC, John Chandioux, Cogentex and Socatra. However, the Canadians have shown themselves technologically innovative and there is also the likelihood that more advanced foreign products such as Siemens' METAL or the Israeli TOVNA will be introduced here.

Several innovations mentioned either above or below -- simultaneous generation of bilingual text, speech recognition, and systems intended for non-translators -- should open up new spheres of use for FAMT in the course of the present decade.[2] In particular the provision of systems for non-translator writers has been called by Claude Bédard "la démocratisation de la traduction".

2. COMPUTER AIDS FOR HUMAN TRANSLATORS (CAHT)

Computer Aids for Human Translators are now so widely used that they reach almost every translator in North America, Western Europe and Japan. Nevertheless, the level of sophistication varies greatly.

2.1 Infrastructure

Available infrastructure includes microcomputers and word processing facilities. Writing aids such as spelling and grammar checkers and style critiquers may also be seen as part of infrastructure, since they are intended for writers in general and not only for translators. There is however, still imbalance between what is available for processing English and for processing other languages: for example there is not the same choice of spelling checkers, etc.; but the situation is improving.

Problems of incompatibility between hardware and software are still a nuisance factor but are decreasing thanks to conversion programs or versatile hardware like the Macintosh Superdrive, which reads and writes both Macintosh and DOS diskettes. The result is that transmission of texts by means of diskettes has become routine. The preferred word processor of Canadian translators is clearly WordPerfect running under DOS. Nevertheless Macintoshes are used by an important minority, usually with Word as word processor. Unix and OS/2 are also present in organizations that can afford bigger or more advanced computers.

Telecommunications have been improving steadily. The transmission of texts between translators and their clients began about five years ago when modems became available for PCs; the speed has since increased eight-fold from 300 to 2400 bauds, with a corresponding

reduction in line time and costs. However, E-mailing of texts has not increased in proportion because a competitive medium has been introduced, fax, and it has spread at such a rate that few businesses will be without one soon. Despite the convenience of fax, it revives the old problem that texts reach the translation office on paper. There are fax cards available that enable microcomputers to emulate a fax; but texts are received and stored by these cards as graphics and so cannot be introduced directly into a word processor. (The problem does not arise when the computer is "transmitting" a fax.) Solutions to this problem are urgently needed and will surely be found within five years.

One solution to the last problem, and indeed to the problem of transferring any translation text on paper to a computer, is "optical character readers" or scanners (OCR). These have become less expensive, more reliable and more adaptable to non-English alphabets in recent years. Nevertheless, apart from the expense, the need to go through the additional operation of scanning remains a handicap.

2.2 Terminology

Translators spend up to a third of their time researching the translations of technical terms. Available aids range from multi-million-dollar term data banks (TEAM and EURODICAUTOM in Europe and their counterparts in Canada and elsewhere), to personal terminology file management software that can be bought off the shelf for a few hundred dollars (e.g. MTX) or even put together by amateur translator-programmers themselves.

The large data banks are widely available through dial-up modem networks, either on a subscription basis (e.g. TERMIUM) or on public utility networks (e.g. BTQ through the Bell Canada iNet,

EURODICAUTOM through MINITEL in Western Europe.) The latest development is the transfer of the content of the banks (notably TERMIUM) to the medium of CD-ROM. At the same time more and more of the traditional dictionaries, both monolingual and bilingual, are becoming available on the same medium (e.g. 'The Oxford English Dictionary', 'Le Robert', the Collins series of bilingual dictionaries.)

Continuing impediments, exemplified by the difficulties with admitting new dial-up subscribers to TERMIUM, are the cost of telecommunications and of the equipment needed at the host computer to handle many calls at a time, the price of the compact disks when sold on a cost-recovery basis, and the incompatibility between the CD-ROM equipment for different types of computers.

Supplying the term banks with their data requires a great deal of skilled labour. Indeed it has led to the establishment of a new profession in Canada, that of full-time terminologist. Some of the work is contracted out to by the banks to cooperating centres, including universities (e.g. the Centre de traduction et de terminologie juridique at the Université de Moncton.) Mostly, however, the remuneration for this sub-contracted work is in kind and not in cash; so that it is a useful but not a profitable operation and should be looked at as a spin-off of translation activities rather than as one which is independently viable.

The high cost and low return of compiling data for the banks makes it imperative to seek ways of introducing automation into that process also. This is the purpose of the ATO project at the University of Quebec at Montreal, which is designing a 'term recognition scanner' (TERMINO) for part-processing the linguistic raw data in texts. The work on TERMINO is funded by the Office de la Langue Française.

2.3 Translation storage and retrieval

The latest software development in this sector, and likely one of the most rewarding in terms of increased productivity, is text management and retrieval systems that capitalize on previous translations to avoid re-translating texts that have already been translated either in whole or in part. At its simplest, such software is no more than a well-indexed filing system for all the texts created with word processors within a translation organization. But Chandioux's GÉNÉRAL TAO at Confédération-Vie (Montreal) and the Translation Support System at IBM Europe presage the next stage, in which constituent parts of documents and not only the entire document are retrievable, and in which 'fuzzy matching' techniques give a great deal more flexibility to the retrieval. Initial installations indicate dramatic increases in productivity.

2.4 The translator workstation and systems integration

Progress on translator workstations has been slower than was expected a few years ago. Considering for example, it is already nearly five years since Socioscope presented CWARC with design specifications for an integrated translator workstation, and that these were intended to guide and stimulate the private Canadian software industry, it is surprising that so little has been achieved as yet. Nevertheless even if the private sector has not moved forward quickly in this area, at least CWARC's own workstation design for the Secretary of State is now undergoing trials, and in the meantime a few translators like Michel Thibodeau of Ottawa have put together their own stations.

In the end another form of integration may preempt the stand-alone

workstation as conceived of in 1986. This is "local area networking" (LAN). By networking individual translators' microcomputers along with those of their terminologists, it becomes easy to access one another's text and data storage without having to deposit everything centrally and manage a large server station.

2.5 Investment in computer equipment

We offer here a 'minimum case' and 'maximum case' example of a professional translator's investment in computer aids.

	Minimum $	Maximum $
Microcomputer (286 IBM or clone, or Macintosh Classic, with HDD and monochrome monitor)	2,000	
More powerful microcomputer with large RAM and HDD, multi-format FDD, colour monitor		4,000
9-pin dot matrix printer	350	
Laser printer		1,700
300 baud modem	150	
2400 baud modem with fax card		600
Compact disk reader with term bank on CD-ROM		2,000
Word processor (with spelling checker and thesaurus)	500	500
Terminology file manager		500
Text retrieval software		350
Desktop publishing software		350
	3,000	10,000

3. EXPERT ADVICE

Despite the wide range of options, and the many pitfalls as well as possibilities that await those who try to automate a translation service, little is yet available by way of services where users can turn for expert, unbiased information and advice. There are not more than half a dozen specialist consultants in this field in Canada, or indeed in North America, and nothing in the nature of a testing centre.

B. RESEARCH

I. RESEARCH CENTRES

Despite the disappointments of the past, most of the basic research, whether in Canada, the United States, Europe or Japan, is still on fully automatic high quality machine translation (FAHQMT). The lull that occurred in the late seventies and early eighties -- around the time when Canada closed down its only centre, TAUM -- is now a thing of the past. Though there are only two research projects in Canada, namely at CWARC and at Cogentex, and a handful in the USA, there are many in Europe and Japan, for a total of about 50 world wide.

In North America and Europe, most of these projects or centres are situated in universities; exceptions are the ones at IBM Yorktown Heights and at BSO in Holland. In Japan they are divided between the universities and the industrial giants.

The size of the centres range from four researchers at CWARC to 40 at Carnegie Mellon. The cost of operating such a centre varies of course, according to size and country. In the case of a large centre like that at Carnegie Mellon the cost approaches $2 million a year.

Besides these centres, there are numerous small endeavours (which we would define as projects involving not more than three investigators), such as Graeme Hirst's project at the University of Toronto or the students who are writing theses on MT at the University of Ottawa. Nevertheless small does not mean unimportant, since in basic research originality counts as much as resources.

The current level of MT research financing is around $17.5 million a year, the bulk of it in North America, Europe and Japan. This

figure is made up as follows:

	$
USA and Canada	4.0 million
Europe (especially Eurotra)	6.0 million
Japan	5.0 million
Rest of the world (China, USSR, etc.)	2.5 million

(Based on a summary of reported research budgets.)

These are direct costs. There is also a cost in infrastructure (shared university facilities, postgraduate student scholarships, etc.)

MT research is being directed toward a capture of a portion of the overall translation service market. In this context, such a level of expenditures for research related to automatic translation, if it were to lead to software which could compete effectively with human translation in a $20 Billion market, can be seen as a very good investment.

2. MAINSTREAM TRENDS

The previous 'generations' of MT research were these:

* First - 'Direct transfer', that is to say, the automatic parsing of the surface grammar structures of source-language sentences, and rules for transforming the structures to make them agree with target-language grammar; together, of course, with automatic dictionaries for vocabulary and phraseology. There are still systems of this generation in current use, e.g. SMART and SYSTRAN.

* Second - 'Deep' structures, and transfers between them through 'pivot' languages. These developments were made possible by the linguistic research that was being conducted on generative transformational grammar, as well as by strides in the computer programming of language analyses and generators. Deep structure means, "the grammatical relationships inherent in the elements of a phrase or sentence but not immediately apparent from their linear sequence." The MT strategy consisted of 'decoding' the surface structure of sentences into representations that showed in a formalized way the deep-structure relationships between the words, and then 'generating' the target language sentences from the deep-structure representations, which thus served as an intermediary between the source and target languages. Decoding the grammatical relationships between words also helped to decide ambiguities and make a better choice of target-language vocabulary. METEO and its Russian-French cousin ARIANE (at the GETA centre in France) are outstanding examples of what is possible using this strategy and level of analysis.

The present generation of research is distinguished from its predecessors by the following characteristics:

* Analysis of semantic structures. The deep structures of the third-generation were mainly representations of syntactic relations. (There were proposals for other types of types of deep structure, e.g. lexical, but they were not implemented.) Now attention has turned to structures that come closer to the semantics of sentences; this explains the almost universal use of 'case grammar' for purposes of analyzing the source language. Again the advance has been made possible by a development in theoretical linguistics.

* Knowledge representation. It is well known that translation is not just a matter of language knowledge; it also requires knowledge of the subject matter of the texts. The problems can be subdivided into the analysis and categorization of individual concepts, and then the structures of complex concepts and information that are built up from them. Indeed these are crucial problems in any kind of artificial intelligence (AI) which draws knowledge from texts, so MT researchers and AI researchers have common interests.

* Inferencing. Another link with AI research is the use of some form of reasoning in the translation process, for instance to resolve ambiguities.

* The use of AI programming languages. We have spoken of the common interests of MT and AI. This is reflected in the widespread use by MT researchers of the two most popular languages for AI: namely LISP, which is particularly suitable for concept and knowledge representation, and Prolog, which is especially good for inferencing. (Note, however, that the use of these languages is not in itself a guarantee of a high degree of artificial intelligence. LE ROUTIER, for example, is programmed in Prolog and uses case grammar, yet it could probably have been

designed as a second-generation system with the same results.)

* Attempts to reduce the tedium and high cost of compiling entries for MT dictionaries by hand, because this is perhaps MT's biggest bottleneck when it comes to building working systems. The work often requires specially trained personnel (as for SYSTRAN.) It is therefore tempting to try and compile the entries by computerized reading and re-coding of existing conventional dictionaries. Several papers at this year's International Conference on Computational Linguistics (Helsinki, August 1990) reported on such projects.

3. OTHER APPROACHES

* The statistical approach. This apparently 'maverick' technique, which is limited to a single project, the one at the IBM Thomas J. Watson Laboratory at Yorktown Heights, USA, actually revives an early MT approach that was abandoned; but now its proponents hypothesize that the vastly greater power and capacity of today's computers, coupled with advances in statistical theory, make it worthwhile to try again. Very simply, the aim is to determine what the statistical probabilities are of any segment of a new source language text being correctly translated by any segment in a corpus of target language texts, and then choose the target language segment with the highest probability. To succeed, the calculations require enormous quantities of text.

* Generation of bilingual texts simultaneously in both languages from numerical or other data bases. This strategy is already represented in Canada by the working system devised by Cogentex for Environment Canada marine weather forecasts (which were not well handled by METEO.) However, it is a direction in which much research is still needed.

* There is a nascent interest in the translation of spoken language as research on speech recognition makes progress (at CWARC, at Carnegie Mellon, at British Telecom, in Japan.) Small prototypes have been built by two telephone companies.

* The use of a bank of existing texts rather than a conventional data base as a knowledge source. This has been proposed by the BSO group in Holland. (The group has also made a name for itself by attempting to use Esperanto as a pivot language.)

* Computerized stylistics is regarded as the icing on the cake by most MT researchers because they have enough problems translating

the content of texts let alone the style. Nevertheless it is being studied in Toronto.

* Systems for non-translator writers who would prefer to produce their own texts bilingually or even multilingually, thereby eliminating the translator. This is different from generating text from non-linguistic data, because interactive design can enable the system to 'consult' a human writer as the processing advances. It is the direction that is now being followed by GETA (France).

4. FORECASTS

World wide:

* Both governments and industry will be motivated to provide increased financing for research projects as the problems of interlingual document and electronic data flow become ever greater, especially in and around the Europe of 1992, and it becomes all the more necessary to meet competitive market demands.

* Applications of AI will percolate from the research laboratories to working systems.

* There will be more attempts to make use of large data bases of existing texts and their translations.

* Likewise capitalizing on existing conventional dictionaries will be an important aim.

* More applications will be found for the strategy of generating bilingual texts directly from a data base or other non-linguistic information.

* Interest in spoken MT will increase as speech recognition improves.

* The software designed for microcomputers will become more user-helpful, to the point that some types of text that would now be sent to a translator will be produced in several languages by the original writer and more translators will compile their own terminologies.

Canada:

In proportion to the importance of its translation industry, Canada

is doing little research at present. What exists is scattered in small units, and private industry lags even more than government. It is therefore important not only for governments to finance such research if Canada is to keep up with the rest of the world, but for it to do so in such a way that the resulting technology will be passed on to the private sector and stimulate it. Canada also needs a Research and Development centre of excellence in this field to act as a focal point where a critical mass of researchers can be drawn together.

One role for Canada is to research and develop component modules of MT systems, for example automated dictionary compilation, rather than whole systems. This kind of 'space arm' contribution would provide a basis for cooperation with centres abroad.

In any event it would be negligent not to pursue research on simultaneous bilingual text generation and on terminology compilation with vigour, because the present Canadian lead in these fields make them exportable technologies.

C. EDUCATION

I. THE TEACHING OF MT AND TST IN CANADIAN TRANSLATION SCHOOLS

The first Canadian university to incorporate these subjects into its curriculum was the University of Ottawa in 1976. Moreover it did so at both the undergraduate and graduate levels. At the undergraduate level is a course on 'Computers and Translation' which has been compulsory since 1980. At the graduate level there is a series of two seminars and students can choose to write their M.A. theses in this field. In fact the LE ROUTIER system that is now being used for Canada Post Corporation grew out of one such thesis. Two of the faculty specialize in this area and there is close cooperation with the Computer Science department.

Undergraduate introductory courses have gradually spread to other universities. For example, the Université du Québec à Trois-Rivières has long had a cooperative project with Consolidated Bathurst which gives students hands-on experience of word processing and electronic transmission of texts. Where there is still no such course, it is due to lack of qualified staff rather than to ignorance of the need.

Furthermore the Office de la Langue Française has made a sustained effort for many years to train translation school students to use and contribute to its term data bank, the Banque de Terminologie du Québec, so that most of today's translation graduates are well-acquainted with this form of computerized aid. The Secretary of State has also been encouraging the translation schools by allowing them free access to TERMIUM.

The Université de Montréal offers graduate students similar facilities to those provided by the University of Ottawa, though its interests appear to be more theoretical. It still has several pioneers of MT research among its faculty: Richard Kittredge and

Jean Baudot of TAUM, and Igor Mel'cuk from Moscow. "CWARC" has been making a contribution by taking on some of their students as trainees.

The Computer Science department of the "University of Toronto" has one professor (Graeme Hirst), who is pursuing an active interest in computational stylistics with his graduate students.

Recently Concordia University in Montreal has introduced a Diploma in CAT. Though the syllabus is limited -- there is but a single course dedicated to CAT/MT -- it is a sign of the times and it will likely be imitated.

It would thus appear evident that the translation school at the University of Moncton could take advantage of having a centre for language processing reseach and development on the campus, though the benefits would be somewhat limited if the university did not have a graduate program in translation. The school might consider imitating the developments at Concordia University by offering a CAT diploma in conjunction with the Centre, but with at least two specialized courses -- probably the academic minimum. These could be taught by staff from the Centre, which could also employ some of the students as trainees. The school's basic BA program would also benefit by incorporating at least one such course.

2. STAFF TRAINING AND PROFESSIONAL DEVELOPMENT

Among Canadian translation organizations, only the Translation Bureau of the Secretary of State is large enough and structured enough to have its own training department with full-time staff and a substantial budget. It follows that elsewhere any training is ad hoc or irregular, and indeed many translators are entirely self-taught in matters of automation.

The suppliers of the 'heavier' MT systems are obliged to provide training, either on the users' premises or their own. Such training may last from a few days to several weeks, during which time a considerable amount of skilled work may be lost to the employer organization.

Independent training courses are available, at public or private institutions, for those translator tools which are drawn from general office automation, notably for the more complex word processors like WordPerfect. These last from a few hours to a few days.

In general the level of training in automation in Canadian translation organizations is minimal unless staff are graduates of one of the few translation schools in which the subject is appropriately taught (see above) or are so interested in computers that they teach themselves. Even where training is available, it is often difficult for staff to take advantage of it because of the pressures of their workload.

The professional associations of translators (ATIO in Ontario, STQ in Quebec, CITNB in New Brunswick, ATA in the United States, etc.) organize interest groups and occasional workshops for working translators. Furthermore their annual conventions nowadays include a session on automation. The function of these activities is, however, more informative than formative. The attendance at the recent conference on the language industries held in Montreal, where 500 participants paid $300 each to attend, indicates that there is a strong demand for more information and exchange of views.

Another contribution of the professional associations is through their trade magazines, all of which regularly carry articles on automation. They are perhaps more influential than the conferences

and conventions, for they reach more people more frequently. The most important are 'Circuit' in Canada (French), 'The ATA Chronicle' in the United States, 'Language International' from England, and 'Lebende Sprachen' (in German, French and English) from Germany. (It should be noted that some of the information contained in this report is drawn from one or another of these journals.)

The relatively small number of MT specialists are somewhat better served by an international series of 'MT Summit' meetings in addition to the long-established biennial International Conference on Computational Linguistics (COLING) and by several research journals.

All in all, there is still room for "more information" and especially more intensive training at the professional level.

D. PRODUCTIVITY

Software manufacturers naturally tend to exaggerate the productivity impact of their systems, quoting machine processing throughput (so many thousand words an hour) without taking into account the limitations imposed by the translation environment (pre-editing, post-editing, dictionary corrections, etc.). On the other hand, the detractors of FAMT are inclined to say that even when it is feasible it is not cost effective -- because, for example, dictionary corrections take too long, or the raw output requires too much revision. The truth usually lies somewhere and is very much dependent on the type of text involved and factors that lie beyond the translation operation itself.

Certainly the potential of FAMT will not be realized unless the system is well-integrated into the overall documentation production process. It is indeed possible for a FAMT system to output tens or even hundreds of thousands words of usable translation a day -- provided no revision is required: examples are METEO for Environment Canada and SYSTRAN for the United States Air Force. It is widely accepted, however, that a productivity increase of 100% to 200% constitutes a reasonable objective in the present state of the art; but also that below the 100% threshold an FAMT system would not be cost effective.

In any case, cost and even speed may be secondary considerations in circumstances where it would be difficult to obtain the translations any other way; for example when there is a shortage of translators for a particular language or there is a security element.

The gains with CAHT are more immediately certain, and though an individual aid may only bring a modest improvement of, say, 10% to 20%, cummulatively they may be as impressive as FAMT -- and for less expenditure both of money and of time. In the best-case

scenario, and considering together all the automation applied, from basic word processing to sophisticated text retrieval, the productivity gain may be as much as 400%.

3. THE CANADIAN CENTRE

A. CONTEXT

A strong demand exists to make translation more efficient, as is borne out by the massive introduction of computers in recent years as an aid to translation. Impressive productivity gains can be achieved in the translation business by the greater use of technology. This becomes particularly critical as the Canadian economy moves into a time of ever increasing international competition.

Canada is in a good position to capitalize on its skills in translation, its research in machine translation and translation support and to use its position as one of the most intensive users of translation services both on a per capita and absolute basis in the entire world.

In order to enhance Canadian international competitiveness through promoting cost effective translation for the private sector; and to develop Canadian industrial advantage both in the sale of translation services and the development and sale of translation support technology, the need for increased and continuing investment in research and development in the language processing sector is evident. This is also consistent with an earlier study conducted by Cognos for the Secretary of State and the Department of Communications, which identified machine translation and the area of natural language processing in general as priority areas for Canadian research and commercial development. However, to date there is no national focus for such research and development around which a critical mass of researchers can be drawn together for substantive results.

Given the importance of translation to Canada, there is an acute

need for a Centre that would act as an information node and support the translation industry in its effort to remain competitive. In this regard it is our opinion that such a centre is feasible if it is appropriately and adequately funded to ensure its long term viability and if its implementation proceeds in a manner consistent with the program outlined in Chapter IV of this report.

B. ROLE

The Canadian Centre to be created in Moncton will carry out research and development based on the needs of the private and public sectors in the area of natural language processing, the outcome of which will be effective and efficient tools and working methods for language processing. Some 70% of the centre's activities will be practical in nature (applications and services), while 30% will be theory-oriented (research).

The centre will also act as a focus for concentrating and supporting the research and development activities of both private and university individuals. In this way it will serve to incubate and facilitate research and entrepreneurial undertakings in the area.

C. ACTIVITY AREAS

In the course of the research leading to this report, interviews were conducted with a wide range of those active in one or more aspect of the translation industry. This resulted in the identification of the following activity areas for the Centre to fulfull the needs that had become apparent through our study, so as to achieve the research and commercial benefits available to Canada in the light of its strengths in the translation sector.

1. A Clearing House

Interviews indicate a need for an information and referral centre, for the entire translation process up to and including MT. The "clearing house" role could include a news bulletin of recent developments in the field or better still an E-mail wire service.

2. Testing Centre for MT and TST systems

There is a need to test and establish benchmarks of MT and TST systems, possibly on a fee or subscription basis.

"What is needed is for some independent institution..... to become the universally recognised body for evaluating translation quality, so that a certain measure of continuity and consistency can be achieved..." (G. Kingscott, Language International 2:1:2)

3. Applied Research

High quality research in the area of bi-lingual text matching and retrieval to support more 'intelligent' retrieval through such techniques as fuzzy matching, would be of the greatest immediate benefit to the translation industry where much of the current activity is in enhancing productivity through the re-use of ready-

made translations.

Generation of bilingual texts from non-linguistic data, which, since it requires knowledge representation could be a good area for collaboration with a centre with Artificial Intelligence expertise such as Carnegie Mellon.

In the area of 'personal translation systems' for use by non-translators, there is an excellent opportunity to cooperate with the French centre GETA.

A final area of application is in the development of tools to speed up the compilation of terminology using texts as raw material. These are badly needed both by translators and terminology banks.

4. Translation Services and Terminology Production

There are specialized translation niches, at least one of which is already being addressed at the University of Moncton (the Centre de Traduction et de Terminologie Juridiques). Providing translation service in these niche areas is an opportunity which could be a useful source of revenue and provide a test bed for developing and trying out translation support systems.

Contracts for developing specialized terminologies using automated tools might also be available.

5. Conferences and Training

There is a need for an agency to take the lead in organizing and hosting important national conferences in the translation and traductique areas, such as the Colloque sur les Industries de la Langue and international conferences in the suggested applied

research areas discussed above. (This would have the added advantage of providing the host with significant and immediate national and international visibility.)

Short tutorial seminars and intensive mini-courses could be planned using in-house resources or by hiring outside experts. This could be built up to a summer school program with an invited international faculty.

In response to the movement by the Associations of Translators to gain more professional recognition (so far only the Association of Translators and Interpreters of Ontario and New Brunswick have their certification recognized by legislation), there is a role to play in the offering of certification courses in areas such as machine translation.

Using the resources of the University of Moncton a multidisciplinary program might be developed in text language processing. For example, there might be cooperation with the Computer Science Faculty to graduate software engineers in the language industries. Models for this multidisciplinary approach are to be found in such programs as York University's Environmental Studies and Canadian Studies Programs where courses are taken in different faculty but lead to a degree in a particular program.

6. Exporting language processing expertise

At present, Canadian firms still tend to view translation services as a cost centre instead of as a productive part of the organization. The centre could play an important role in working towards changing that attitude and emphasizing that translation expertise is a positive asset for a firm. Translation capability enhances existing information resources and can assist in generating value-added benefits through expanded markets. In the

context of a united European market and global trade, more and more companies will need a translation component to penetrate foreign markets and gain competitive edge. Canada has an advantage over monolingual countries in this area and should turn that to an asset in positioning its products in Europe and Africa.

There already exists a great demand from African francophone countries for translation expertise and the demand for software remains to be created. Funds may be available from the Canadian International Development Agency to plan and manage projects in the area of language text processing in Third World countries. This would be in accordance with CIDA's philosophy of linking aid with trade. There is an increasing need in these countries for technical translations of the documentation accompanying technology transfers. Similarly opportunities for joint research with the International Development Research Centre to develop local applications of traductique using existing information systems should be explored.

4. THE IMPLEMENTATION PROGRAM

A. STRUCTURE OF THE CENTRE

The Centre is to be an autonomous non-profit organization situated on the campus of the University of Moncton. The Centre, which would have a national perspective, would have an independent Board of Directors. The Board would include local, national and international members. The main funders would sit on the Board as ex-officio members. The President of the Centre (CEO) would also Chair the Board. The Centre would enter into cooperation agreements with public, private and institutional groups both national and international such as GETA--Grenoble, and Carnegie-Mellon.

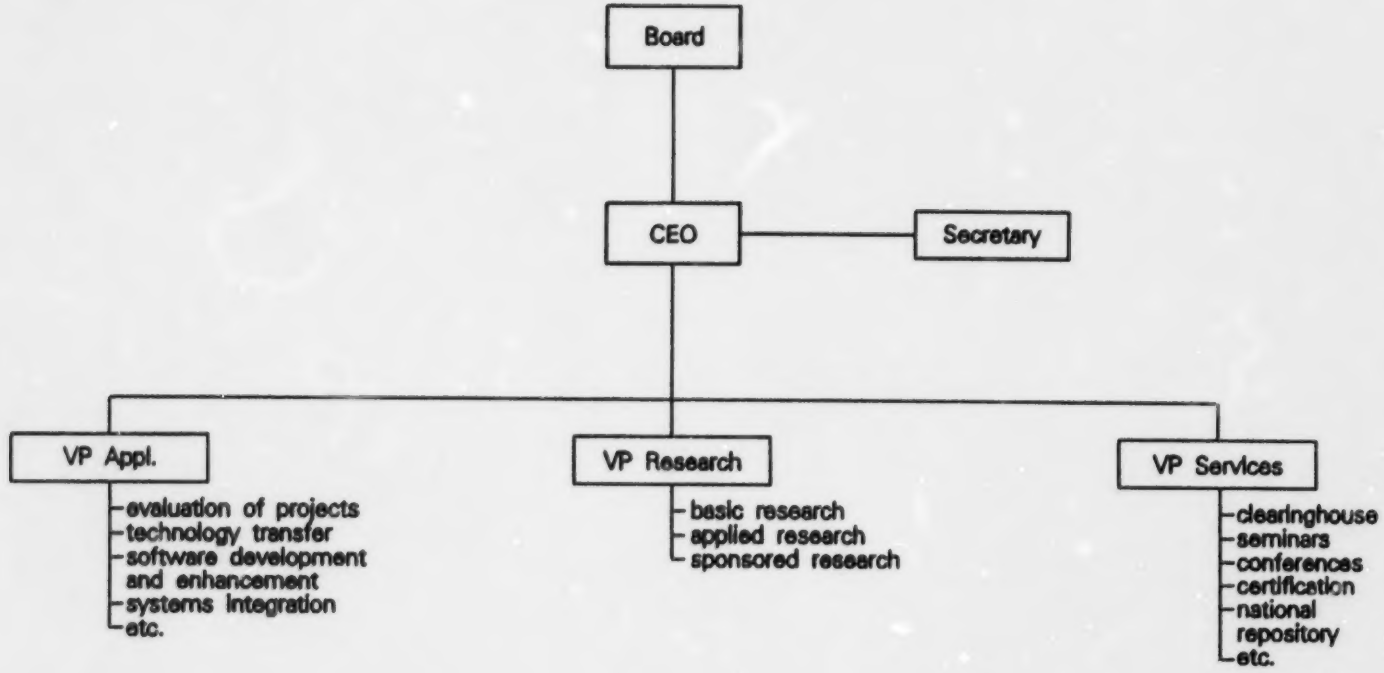
The operations of the Centre would be structured as shown in Exhibit 1. There would be three principal activities:

(1) the provision of a number of specific services under a Vice President, Services;

(2) research under a Vice-President for Research; and

(3) technical development under a Vice-President for Applications.

Exhibit 1
Organization Chart



B. PROFILE OF ACTIVITIES

The work program of the Centre responding to the needs/activity areas identified in Chapter III Section C above would be rolled-out in two distinct phases.

Phase 1

In the first year, a number of high-profile services would be introduced under the V.P. Services to position the Centre as the national focus for natural language processing. These would include seminars and training programs as well as a clearinghouse for resource information. These services would multiply in subsequent years. In this way the Centre would begin to make its mark early-on. A critical component of the work program would be the development of a marketing strategy for the activities proposed for the Centre.

Phase 2

In the second year, a V-P Research would be appointed to develop and oversee the research program which would be launched in the third year. A major element of the research program could be the appointment of an internationally recognized expert to a Research Chair under the NSERC Industrial Research Chairs Program. This appointment is key to the establishment within five years, of an internationally recognized research program. Specific potential research areas could include:

--the generation of bilingual text from non-linguistic data
--personal translation systems
--automatic dictionary compilation
--and knowledge based machine translation.

As well, a V-P Applications would be appointed to launch specific

application activities in the second year, such as:

--bilingual text retrieval including fuzzy matching

--distributed work stations

--and adaptation and evaluations of existing systems.

In summary then, the focus of the work program is on services for the first two years. Some application related activities would start in the second year. In the third year, the research program is initiated. The roll-out of the activities of the Centre is shown schematically in Exhibit 2. This roll-out should be seen as preliminary. The final work plan would be approved by the Board.

Exhibit 2
Roll-Out of the Centre's Activities (Preliminary)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Services	- establish clearinghouse	- develop clearinghouse network	- evaluate clearinghouse concept and set new directions (e.g. cost recovery)	- augment clearinghouse resources	- evaluate results of clearinghouse activities
	- develop national repository concept and begin implementation	- augment national repository resources	- as per year 2	- as per year 2	- as per year 2
	- develop training program and hold 2-3 seminars	- refine training program and hold 6(+) seminars	- as per year 2	- as per year 2	- as per year 2
	- hold major conference to launch centre	---	- hold major conference to launch research program	---	- hold major conference on research results
Applications	---	- begin software development and enhancement - initiate a systems integration project	- continue year 2 activities	- continue year 2 activities - augment with new projects	- continue year 4 activities
	---	---	- begin evaluation of products	- continue year 3 activities	- continue year 3 activities
	---	---	- begin technology transfer	- continue year 3 of activities	- continue year 3 activities
Research	---	---	- begin research program	- continue a research program	- as per year 4
	---	---	- establish Research Chair	- Research Chair in place	- as per year 4

C. STAFFING

The actual staff numbers as illustrated in Exhibit 4, must depend on the scale of operations, to what extent work is contracted out, and so on. In some cases a single person may acccumulate functions or pass from one function to another. However, a certain minimum size is necessary in order to ensure a sustained effort and to form a critical mass. In the research area for example, this means a research staff of six plus support staff. As continuity at the head of the Centre is considered crucial to its successful creation and implementation, it is assumed that the current Project Leader will become the Centre's first CEO.

In this respect, the main initial preoccupations of the Project Leader will of course be to achieve adequate funding for the Centre.

Unless he is successful in this, the critical size referred to above will not be acheived and even if the Centre makes a start it will not be able to keep itself on the leading edge.

A further responsibility of the C.E.O. would be institutional relations. This involves developing and maintaining cooperative relations with and within the University of Moncton, with government, other research centres, the private sector and so on.

Language policy should be decided at the start because of its possible effect on recruitment. It is in the interest of several parties -- the University, the federal and New Brunswick governments-- that the Centre operate bilingually. In practice, since English is the dominant language of technology, this means that a decision must be tken and respected about the use of French. Fortunately the technical jargon of computing, and more specifically of computational linguistics, is well-developed in French to the point where the language itself does not present a

problem. We therefore recommend that the use of French be encouraged within the Centre and in joint activities with the university. In order to realize such a policy, it is essential that a "critical linguistic mass" be miantained on the French-speaking side. This will require in turn that a certain minimum of staff be naturally French-speaking and that the majority must be fluently bilingual. Furthermore, care should be taken to ensure that the critical mass is maintained at both the senior and junior levels.

An important component of pre-opening planning is the selection of equipment. It is important not only to acquire adequate and reliable equipment that can be updated easily as the Centre develops, but also to see to its internal and external compatibility and networking. For this reason we suggest as a priority the appointment of the Computer Manager, who should have a good knowledge of both hardware and software. By the end of the first semester of operations, the equipment must be installed and thoroughly debugged in order to avert frustrations when the application and research teams start their work.

The Administrator will be responsible for internal administration and financial accountability. As it is important to institute sound administrative practices from the start, this appointment should be an early one. The V.P. Services will be responsible for the organization and the logistics of extra-mural activities like conferences and seminars. One of the first tasks will be to convene an opening conference at which the role of the centre could be discussed with all interested parties -- including the funding, R & D and user communities.

The V.P. Applications clearly has a key part to play in the Centre's development and success. Beyond general software knowledge, specific expertise is called for in linguistic programming and data bases. The holder of this post would be under

pressure to produce results rather quickly, since the CEO will in large measure be looking to him or her to establish the Centre's technical reputation as early on as possible.

Consequently a crucial choice has to be made at the start of operations as to which initial applications project to pursue. At the time of writing, it would seem that the area in which the Centre could most quickly make its mark is that of management and retrieval of texts and their translations, first because there are already signs that this is an emerging type of application which is going to spread very quickly throughout the translation industry, and secondly because it is within the state of the art.

The appointment of a Documentalist is dependent on whether there is to be a clearing house for specialized information and references. Initial soundings indicate that such a service would be appreciated by the user community even if potential users are not prepared to pay large fees for it. If the appointment is decided on, then it should come early because it takes time to build up the holdings and resources of such a centre to the level at which they meet users' expectations. The Documentalist should have had experience with automated documentation and information systems and be acquainted with the MT and TST field.

Toward the beginning of year 2, the work on the applications project will require a team of programmers and linguists (we use the term 'linguist' very broadly here, since the type of linguist depends on the project chosen). The programmers should have experience in language programming. Experience is important because of the urgency to succeed with the first project; there will not be time for a protracted learning curve. Indeed some consideration might be given to taking over a project already under way elsewhere. It should be possible to recruit some at least of the team from the University, given the human resources currently available there and the University administration's stated

willingness to second staff. However, on the applications side of the Centre practical ingenuity and skills should prevail over academic interests and qualifications.

With the structure established, the work started and outside awareness of the Centre beginning to spread, the NSERC industrial research chair should be applied for; because if obtained it would greatly facilitate recruitment of the VP Research.

During year 2, the main preoccupation inside the Centre would still be the initial applications project. However, assuming there is a prototype of the application running, and in anticipation of the research effort that would be coming over the horizon, it would be opportune to raise outside awareness by holding a major conference -- either by organizing a new conference or by hosting one in an established series like the MT Summits. This would be on a larger scale than the opening conference earlier on.

The latter portion of year 2 would be marked especially by the launching of the basic research wing of the Centre. The VP Research is presumed to have been appointed in the previous quarter. An important decision, especially from the University's point of view, is whether this key person would also hold a senior post on the university faculty. If this were so, it would add to the prestige of the post and make it all the more attractive to anyone who had to be wooed from another institution; and that in turn would redound to the status of the Centre. On the other hand, we understand that the granting of an NSERC chair is not contingent on the attribution of a university post.

Whatever the organizational affiliation chosen, the VP Research should clearly be a person with an established reputation, capable of recruiting and leading other researchers. It is perhaps with this post more than any other that the question of employing a foreigner may come to the fore. As the Centre is to be a 'national

centre', it is certainly very desirable that such a prominent position should be occupied by a Canadian -- but only if a first-class candidate is available.

The choice for the initial research project can scarcely be predicted so far in advance, and it would greatly depend on the interests and expertise of the VP Research. Nevertheless we can propose some selection criteria, without putting thesse in any order of priority:

* Available Canadian expertise
* Research cooperation agreements negotiated in advance by the CEO
* The level of activity that the Centre is by then capable of supporting
* Graduate programs in the university
* Involvement of both the French and English languages
* The time frame -- more long-term or less.
* The likelihood of obtaining grants or contracts for the topic or area selected.

If a choice had to be made today, the generation of bilingual texts from non-linguistic data, a technique which promises to make the best possible use of knowledge representation and would thereby be linked to research in AI, would be a very strong candidate.

D. FUNDING

1. FINANCIAL REQUIREMENTS

The financial requirements for the first five years are based on the roll-out scenario developed in Section (B) above and is summarized in Exhibit 2 which in turn is based on the activity areas identified through our study (Chapter III, Sectn. C). They reach $3 million a year in the fifth year, as shown in Exhibit 3. The preliminary forecasts of financial requirements for the first five year of operation is shown in Exhibit 4.

To support this level of activity on a continuing basis would require a minimum endowment of $20 million (1990 dollars) of which about 10% per annum would be used to maintain the operating budget. This minimum level one-time front end funding would be the only effective way to ensure self-financing for the centre and a critical mass of effort for worthwhile results, and to permit the centre to keep up with technology and to attract and retain the right people.

As well, there would be an initial capital requirement for the following:

•	equipment (computers, furniture, etc.)	$ 1,500,000
•	building (10,000 sq.ft.)	$ 1,500,000
•	land	$ 1,000,000
	TOTAL	$ 4,000,000

Exhibit 3; Preliminary Operating Budget Forecast

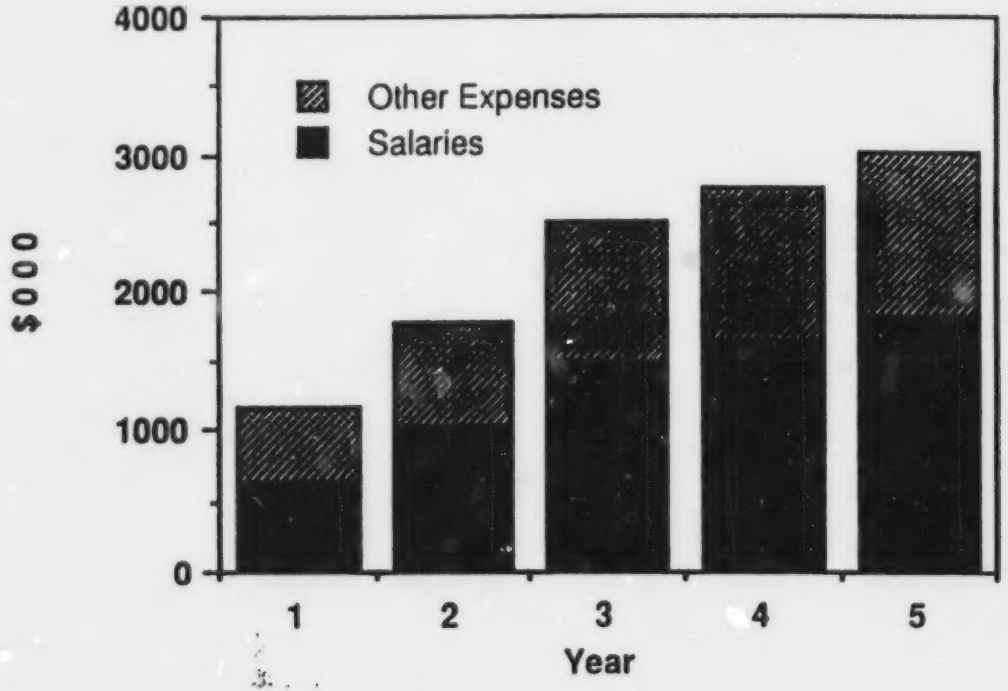


Exhibit 4
Forecast of Financial Requirements for First Five Years of Operation
• Based on Current Dollar @ 5% Inflation

	Year 1 ($000)	Year 2 ($000)	Year 3 ($000)	Year 4 ($000)	Year 5 ($000)
Salaries					
President (CEO)	85	89	94	99	104
- Secretary/E.A.	40	42	44	46	48
V-P Services	80	84	88	92	97
- Secretary	25	26	27	28	29
- Project Officers	100(2)	105(2)	165(3)	173(3)	182(3)
- Documentalist	40	42	44	46	48
V-P Applications	--	84	88	92	97
- Secretary	--	26	27	28	29
- Linguists	--	63	132(2)	139(2)	146(2)
- System Specialists	60	126(2)	132(2)	139(2)	146(2)
V-P Research	-	84	88	92	97
- Secretary	-	-	27	28	29
- Research Assistant	-	-	88(2)	92(2)	97(2)
- Researchers	-	-	132(2)	209(3)	293(4)
Administrator	50	53	56	59	62
- Financial Officer	35	37	39	41	43
- Administrative Officer	35	37	39	41	43
Subtotal	550(11)	898(16)	1310(23)	1444(24)	1590(25)
Add Benefits (10%)	633	1033	1507	1661	1829
Expenses (travel, tel, etc)	76	124	181	199	219
Equipment Upgrade/Maintenance	95	155	226	249	274
Support Services Including Building Maintenance	356	468	601	651	706
Grand Total	1160	1780	2515	2760	3028

( ) indicates number of people

2. SOURCES OF FUNDING

The three sources envisaged for funding the establishment of the Centre are:

--operations--Atlantic Canada Opportunities Agencies.....$20 M
(endowment)
--facilities--Commerce and Technology New Brunswick.....$3 M
--land--Universite de Moncton.....$1 M.

As for the sources of ongoing financial support, the principal ones are listed in Exhibit 5. In this respect, subscription fees for membership should also be explored as an ongoing source of funds for the Centre.

As well, the Centre could profit from the Federal government's policy of favouring Atlantic Canada for industrial benefits associated with major government procurements (ie. Crown Projects). For example, Mitsui Corp. of Japan is currently looking to invest in Atlantic Canada as a condition of being awarded a major contract related to the Canadian Frigate Program.

Finally, as a logical extension of the federal government's sponsorship for the creation in Moncton of the national focus for language processing R & D, it is assumed that it would also transfer to the new centre its current relevant functions such as the section within the Canadian Workplace Automation Research Centre currently active in machine translation R & D.

EXHIBIT 5

Principal Sources of On-Going Financial Support

<table>
<tr><th>SOURCE</th><th>DETAILS</th></tr>
<tr><td>Research & Training Contracts</td><td>
While it is very difficult, if not impossible, to forecast the exact number and size of available contracts, experience nonetheless reveals that in the case of this Centre, based on the proposed implementation program, it is reasonable to expect the following roll-out of contracts from the private and public sectors, in a proportion of 30% and 70% initially and progressing toward 50% at the end of 5 years.
<table>
<tr><th></th><th>1
($)</th><th>2
($)</th><th>3
($)</th><th>4
($)</th><th>5
($)</th></tr>
<tr><td>Public</td><td>7 000</td><td>17 500</td><td>45 000</td><td>120 000</td><td>250 000</td></tr>
<tr><td>Private</td><td>3 000</td><td>7 500</td><td>30 000</td><td>80 000</td><td>250 000</td></tr>
<tr><td>Total</td><td>10 000</td><td>25 000</td><td>75 000</td><td>200 000</td><td>500 000</td></tr>
</table>
To this effect, the Centre's client base would consist, at least initially, of the domestic translation business which is made up of some 1500 independent translators, 200 translation agencies, 300 firms with in-house translation services, and the federal and provincial translation services. Computer equipment and software suppliers have also expressed their interest in participating in joint research/development projects. Eventually, at the international level, opportunities for funds would also exist via CIDA and the "ACCT" (francophonie), as well as for joint projects with organizations in other countries.
</td></tr>
<tr><td>Université de Moncton</td><td>Support services for the Centre.</td></tr>
<tr><td>ISTC-AI Fund</td><td>Machine translation is a priority area.
Final round to allocate the last $2 million in the fund to begin in February 1991.</td></tr>
</table>

Appendix 1

THE USE OF TRANSLATION SUPPORT IN CANADA

i Computer and Word Processing

The most common translation tool now used by the professional translator.

ii. Translator Workstation

To the word processing software are added acccess to a terminology bank, document comparisons, an on-location database and possibly a text search or any other software supporting translation. Many variations of translator workstations now exist.

iii. Telecommunications

A modem and a fax are used to send and receive texts and to communicate information back and forth concerning translation. A modem provides access to public terminology banks, such as Termium (Federal) and the BTQ (Quebec).

iv. Network

The next step is to connect the translator workstation in a network so as to increase the functionalities and software available at each workstation. This allows for access to corporate or external terminology banks, the online management and tracking of the translation workload, electronic mail and possibly the use of specialised software to search and retrieve previous translations, to call up standard formats or shells, to compare texts, and to re-use previous translations in part or in whole.

v. Computer Assisted Translation (CAT)

The translator who uses his computer to compose his translation, to consult terminology banks, who uses specialized software to search texts and parts of texts of previous translations, who builds a lexical dictionary and stores it in computer memory, is in fact doing computer assisted translation.

vi. Machine Translation (MT)

Machine translation (also known as Automatic Translation) aims to reduce to a minimum any human intervention on a text translated by a machine.

1. Independent Translators

There are an estimated 1,500 full-time independent translators in Canada. While some still dictate their translation, receiving both a printout and a diskette of the source text, their draft translation and the final version will be prepared on a word processor. Although there is wide variation in the use of electronic support tools by independent translators, whatever the method of working, **the computer and the wordprocessor have become the basic working tool.**

2. Translation Agencies

Even though the two hundred or so contract translation agencies in Canada hire from five to sixty five persons each most also rely on a reserve army of independent translators for up to 40% of their translations.

In the cases of the most advanced use of technological support tools in translation agencies one developed a full-fledged machine translation system specifically to meet the needs of its client, and another designed specialized software in order to exploit previous translations and greatly increase productivity.

A Canadian agency developed an MT system specifically to meet the needs of a major Canadian corporation that required bilingual itineraries for drivers and delivery personel. Human translation of these itineraries was proving to be prohibitively costly as well as very tedious for humans. The high volume of text and the limited sentence structures made MT a viable alternative. The program was written in Prolog using off the shelf software. The system translates flat descriptive sentences in the present tense. It is described by its creator as being at a "grade 2 performance level". However, this is sufficient for this type of translation.

Another translation agency, a foreign subsidiary have developed a system which offers two modes: the "transactive" mode in which the translator and system work together conversationally to do the translation; and the AUTOTERM mode. The latter provides a terminology management system, displaying its dictionary entries in a window on a split screen on which the source text and the translation in the course of composition are also displayed. The agency only uses the AUTOTERM mode as the transactive mode is too slow.

Most striking is the fact that AUTOTERM has now also added a module for finding previously translated passages, using a text data bank that has been built up from manuals already translated. New texts are scanned automtically for matches with previously translated

texts (this part of the operation is handled by a technician) and only the unmatched portions are presented to the translators. This has led to a great increase in productivity.

3. Translation Services within Private Sector Firms

There are approximately 300 firms with in-house translation services in Canada. All the firms surveyed employed computers for their translation and more than half were networked. Most also had software to register and track the translated texts. There was no uniformity with regards to storage of translated texts. A few of the technologically advanced firms had a system to access terminology banks at the workstation as well as a provision for permanent electronic storage. As for the others,the majority still had not automated their in-house terminology banks so as to have them available online to their translators. For many, this was the immediate task they were looking to address.

4. Public Translation Services

The public sector is the most important client for translation in Canada. The translation services of the Federal and provincial governments respond to the need for translation of all departments and agencies.

Translation services of various forms exist in all provinces. In three provinces no official provisions are made for providing translation services but some effort is made to meet translations needs. In British Columbia, there is a translation coordinator and when translation is required a bidding process with private contractors is initiated. In Nova Scotia a consultant to the Department of Education does official translation on request. In Newfoundland a request for translation, when it occurs will be routed to the French Language Section of the Department of Education.

Saskatchewan, Prince Edward Island, the Yukon and the North West Territories have translation services that stand alone or are linked with sections looking after "des Affaires Francophones".

These services have all been created in the past two years or less and employ one to four translators full-time. All have been equipped with computers and word processing facilities and have access to Termium on hard disk.

The translation services of Alberta (four translators) and Ontario (11 translators, 2 terminologists) are working for their provincial Departments of Inter-Governmental Affairs. The translation service in Quebec (15 translators) is within the Department of Communications, in New Brunswick (30 translators and 4

terminologists) for the provincial Department of Supply and Services and in Manitoba for the Department of Culture, Heritage and Recreation.

The translation services of these provinces all have translators working on computers with word processing software, and dictionaries, spelling checkers and word-counters. Only the translation service of New Brunswick is on a network. All have access through a specialized terminal to Termium and/or the BTQ. The in-house terminology banks for all these provinces have not been transferred to electronic form as yet. Ontario and New Brunswick use software support for recording and managing the demand for translation.

Translation Bureau: Secretary of State

The Translation Bureau is responsible for translating all Canadian government documents in one of the two official languages, and for translating certain specific items between the official languages and up to 70 foreign languages.

The Translation Bureau employs approximately 1,200 translators and 130 terminologists. Of this number, many are expected to retire in the next five years and there is some concern that their replacement with young graduates from university translation schools will be insufficient.

A recent Treasury Board Policy aims to contract out up to 50% of all translation assigned to the Translation Bureau. Last year the Translation Bureau contracted out 37% of its translation volume.

The Translation Bureau concentrates its technology efforts at both ends of the spectrum with its pilot translator workstation project and six sites currently testing the Logos machine translation system.

Eighty per cent of the translators now translate directly on newly acquired computers (last year the Translation Bureau purchased 600) or on dedicated word processing machines. Each unit also has a dedicated terminal for accessing Termium, the terminology bank of the Secretary of State.

The translator workstation pilot is being tested with ten translators in Vancouver. The first version of the translator workstation is based on the word processor and has as other utilities a thesaurus and spelling checker in both French and English. Alongside the word processor, commercial programs are being added for managing local and shared terminologies, correcting grammar etc. This is not a fixed list as other useful applications will be added to the current prototype as they are identified. The

next stage will be to network the workstations and to provide direct access to Termium from each translator's machine.

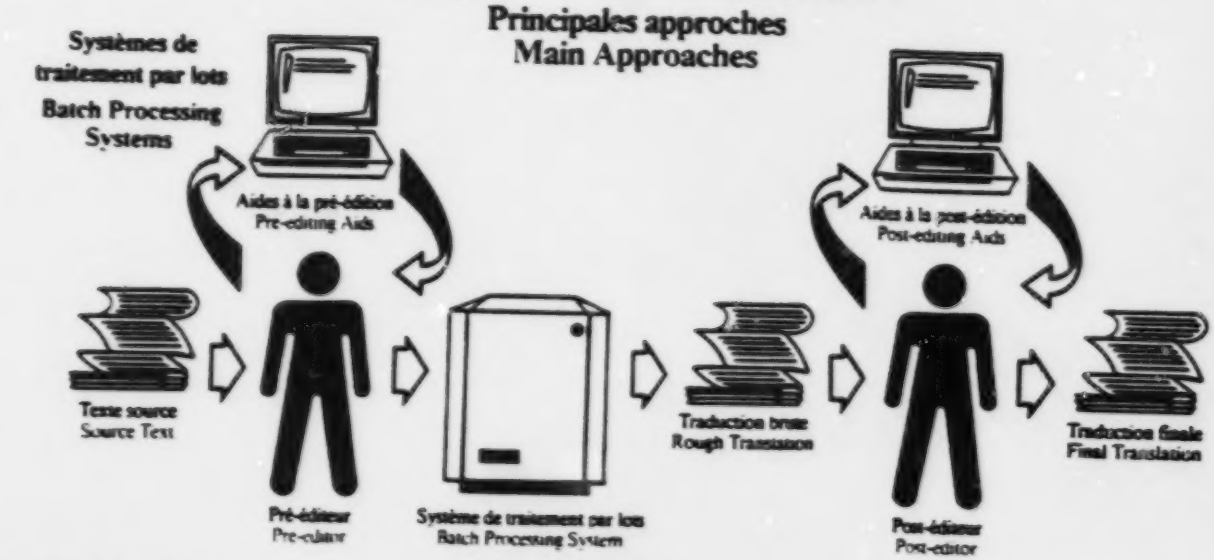
Unlike in the private sector, no systematic attempt is currently underway to re-use previous translations as a resource for facilitating current translation and to avoid re-translations of the same text. This points to great gains in productivity to be made in rethinking the workflow of translation in the Federal government with the application of software supporting the entire translation process, especially now that up to 50% of translations will be going out to independent translators.

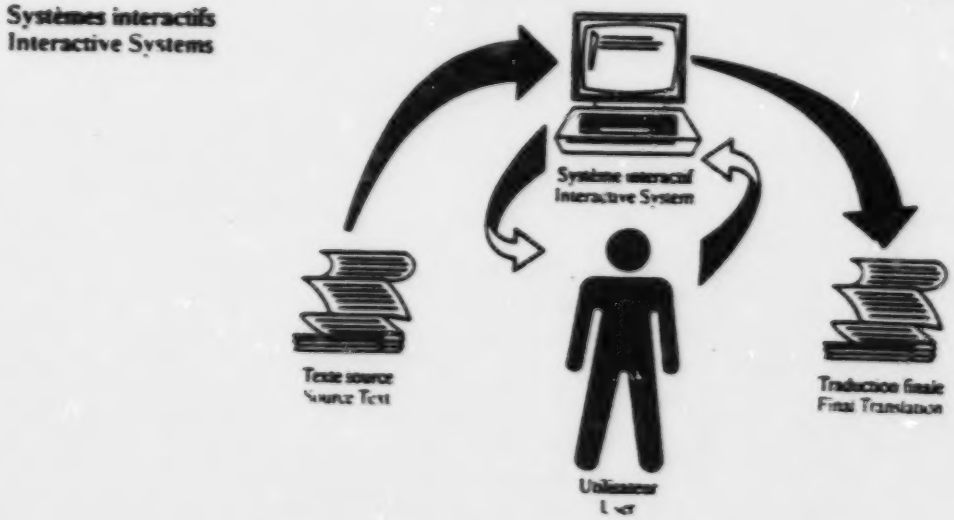
Secrétariat d'État du Canada | Department of the Secretary of State of Canada

CENTRE D'EXPERTISE

Traduction assistée par ordinateur
Computer Assisted Translation

Principales approches
Main Approaches

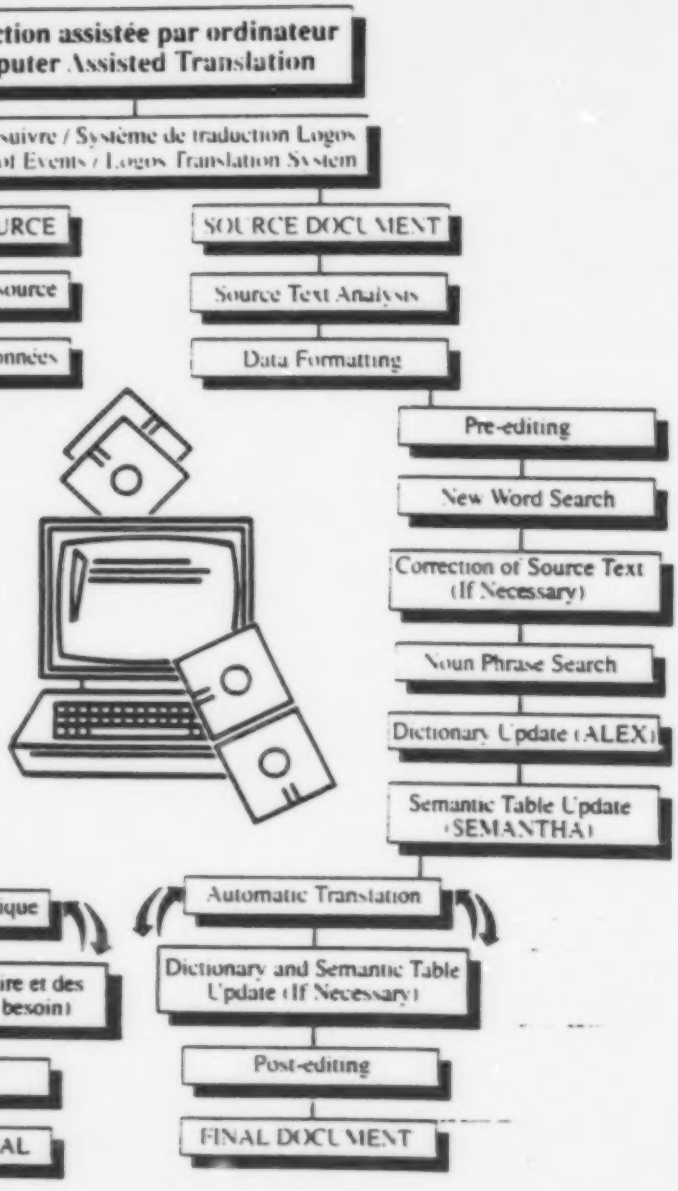




Canada

Secrétariat d'État du Canada / Department of the Secretary of State of Canada

CENTRE D'EXPERTISE

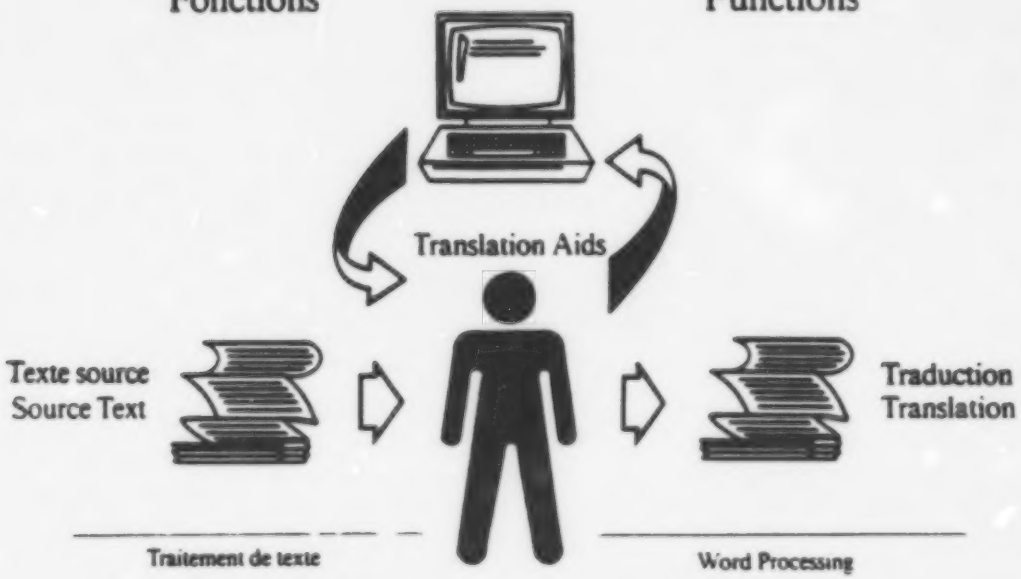


Canada

CENTRE D'EXPERTISE

Poste de travail du traducteur
Translator's Workstation

Fonctions	Functions
Traitement de texte	Word Processing
Consultation de TERMIUM	Querying TERMIUM
Consultation/mise à jour de dictionnaires	Querying/Updating Glossaries
Analyse de textes	Text Analysis
Recherche de documents	Document Retrieval
Compte de mots	Word Counting
Courrier électronique	Electronic Mail
Télécommunications	Telecommunications
Vérification orthographique	Spell Checking
Comparaison de fichiers	File Checking



Canada

Appendix 2

LIST OF INTERVIEWS

RESEARCH INSTITUTES

Carnegie Mellon University, Center for Machine Translation (CMT)
Pittsburgh, USA

Dr. Sergei Nirenberg

BSO/Research, Distributed Language Translation (DLT)
P.O. Box 8348
NL-3503 RH Utrecht
The Netherlands

Dr. Job Van Zuilen

Canadian Workplace Automation Research Centre
Communications Canada
1575, Chomedey Blvd.
Laval, (Quebec)
H7V 2X2

Mr. Pierre Isabelle

PUBLIC SERVICES OF TRANSLATION AND TERMINOLOGY

The Secretary of State of Canada
Jules-Leger Building
Terrasses de la Chaudiere
15 Eddy Street
Ottawa K1A 0M5

Mr. Alain Landry
Assistant Under Secretary of State
Official Languages -Translation

Mr. Ming Tsui
Director General
Planning Management and Technology Branch

Mr. Pierre Tellier
Planning and Policy Directorate

Regional Bureau of Translation Services
Mr. Alain Otis
Chief, Translation Services
Secretary of State of Canada
236 St George
Moncton
Nouveau Brunswick
Tel: 506 851-7055

TRANSLATION AGENCIES

Ink International
P.O. Box 5477
1007 AL Amsterdam
The Netherlands

Multiscript/La Languagerie
Montreal

Daniel Vincent
President

ASSOCIATION OF TRANSLATORS OF QUEBEC
Pierre Marchand

USERS

IBM Canada Lted
5, Place Ville-Marie
Montreal, Quebec
H3B 2G3

Richard Kromp
Director of Terminology and Linguistic Programs

Chantal de Lorme
Director of Translation Services

Air Canada
Beaverhall Building
500 Rene Levesque Blvd.
Montreal, Quebec

Mme Michelle Perrault
Director of Translation Services

Lavallin International
1100 Rene Levesque Blvd.
Montreal, Quebec

Mme Huguette Dufort
Director of translation Services

Royal Trust
Royal Trust Building
630 Blvd Rene Levesque
Montreal

M. Guy Provencal
Director of Translation Services

Hudson Bay Company
585, Ste-Catherine west
C.P. 6066 Montreal, Quebec
H3C 3E9

Nunzia Iavarone
Chief of Francization and Linguistic Services

Confederation Life
Montreal

Jean-Pierre Bernier
Denise Della Mora
Translation Services

General Motors
Oshawa, Ontario

Mrs. Brown
Director of Translation Services

PROVINCIAL GOVERNMENTS

Government of Ontario
Translation Services

Mme Micheline de Bruyne
Cheif, Government Translation Services
7th Floor, Ferguson Building
77, West Wellesley
Toronto, Ont.
M7A IN3
Tel: (416) 965-3044

Government of Quebec
Translation Services

Mr. Pierre Larochelle
Director
Department of Communications
150 Boulevard Charest ouest,
Ste Foy, Quebec
Tel: (418) 943-9450

Government of New Brunswick
Translation Bureau

Mr. Andre Carriere
Director
Communications Division
Supply and Services
Marieville Place
20 rue Mc Gloyn
Fredericton, New Brunswick
E3B 5H1
Tel; (506) 453-2920

Government of P.E.I.
Francophone Secretariat

Mr. Theodore Theriault
Director
Wellington, P.E.I.
C.P. 58
Tel: 902 854-3131

Government of Nova Scotia
Department of Education

Audrey Leblanc
Director
Curriculum Development/French Language Programs
4th Floor, Trade Mart Building
Halifax, Nova Scotia
C.P. 578
B3J 2S9
Tel: (902) 368-4509

Government of Newfoundland
Department ofEducation
Language Programs Section
Tel: (709) 576-2300

Government of British Columbia
Reference for Translation
(there is no official responsibility for translation, contracts for translation services are granted on a needs basis only)
contact: Vivian Bruce
reference librarian
Tel: (604) 387-6510

Government of Alberta
Department of Intergovernmental Affairs

Isabelle Mill
Director
Alberta Translation Bureau
2200 - 10025 Jasper Avenue
Edmonton, Alberta
T5J 1S6
Tel: (403) 427-9693

Government of Saskatchewan
Office for the Coordination of Francophone Affairs

Mr. Paul Heppelle
Director
1919 Saskatchewan, 10th Floor
Regina, Saskatchewan
S4P 3V7
Tel: (306) 787-2028

Government of Manitoba
Culture, Heritage and Recreation

Mr. Andre Martin
Director
Translation and Interpretation Services
177 Lombard, 6th Floor
Winnipeg, Manitoba
R3B 0W5
Tel: (204) 945-3798

Government of Yukon
Council of Ministers

Mr. Rino Ouellet
Director
Bureau of French Services
Whitehorse, Yukon
Y1A 2C6
Tel: (403) 667-3735

North West Territories
French Services

Andree Bujold
Translator
Tel: (403) 920-3375

Meetings Held in New Brunswick

Mrs. Claire Lepage
Federal Provincial Relations
377 rue York 2nd Floor
Fredericton, New Brunswick
Tel: (506) 453-2277

Mr. Paul Landry
ACOA
570 rue Queen, 3rd Floor
Fredericton, New Brunswick
Tel: (506) 452-3124

Mrs. Christine Nafrallah
New Brunswick Power

Mr. Lachaine
Marine Atlantique
Marine Atlantique Building
100 Cameron
Moncton, New Brunswick
Tel: (506) 851-3600

Mr. Frederique Gronier
President
Canadian Association of Translation Schools
Moncton, New Brunswick
Tel: (506) 858-4214

Mr. Alain Otis
Cheif, Regional Bureau of Translation Services
Secretary of State of Canada
236 St George
Moncton
New Brunswick
Tel: 506 851-7055

Mr. Andre Carriere
Director
Communications Division
Supply and Services
Marieville Place
20 rue Mc Gloyn
Fredericton, New Brunswick
E3B 5H1
Tel; (506) 453-2920

Moncton University
Moncton, N. B.
E1A 3E9

Faculty of Law
Centre for Judicial Terminology and Translation
Mr. Gerard Snow
Director

Translation Department
Mr. Frederique Gronier
Director

Mr. Charles Zama
Assistant Director and Cheif of Translation Services

Informatics Departement
Mr. Julien Chiasson
Assistant Director

School of Engineering and Centre for Manufacturing Technology
Mr. Jean-Rene Longval
Director

Mrs. Aurele Losier
President
Translators Association of New-Brunswick
Fredericton, Nouveau Brunswick

BASE DE DONNEES (Version imprimée)

I. LOGICIELS et PROGICIELS de TA et TAO

Version 1-08-91

*****

INTRODUCTION

Ce répertoire renferme quelque 160 fiches, toutes de logiciels actuellement en exploitation. Les données proviennent de publications, de textes publicitaires, et d'entretiens personnels.

Les logiciels dont le prix n'est pas indiqué ne sont pas, en général, disponibles dans le commerce.

Nous utilisons les symboles suivants :-
-> voir fichier des adresses
> traduction vers ..., p.ex. *%anglais>%français* signifie «de l'anglais vers le français» ;
<> traduction dans les deux sens, p. ex. *%anglais<>%français* signifie «de l'anglais vers le français et vice versa» ;
% précède un descripteur. Les descripteurs sont surtout utiles pour le dépistage des données par ordinateur à partir de la copie du répertoire sur disquette. Une liste des descripteurs figure à la fin du répertoire.

Version sur disquette

Nous fournissons avec l'imprimé une copie de la banque de données sur disquette. La disquette contient trois fichiers portant le nom «DB-MONC1» (celui des logiciels), «DB-MONC2» (la liste des descripteurs) et «DB-MONC3» (le bottin des institutions et sociétés). Elle est formatée en format DOS et le contenu des fichiers est écrit en code ASCII, permettant ainsi sa lecture par la plupart des logiciels de traitement de texte.
Avant de procéder a l'utilisation de ces fichiers, veuillez lire attentivement le fichier auxiliaire «LISEZ.MOI»

* * *

**ADVANCED TELECOMMUNICATIONS RESEARCH «ATR»
Fabricant: Japan Telephone Co ->
Lancement: vers 1999
"Little information has become available since the start of the project." [Kingscott, "Applications of Machine Translation"]
Descripteurs: %recherches-%parole %recherches-%Japon %parole-%japonais %parole-%Japon %TA-%IA

**AIDTRANS
Fabricant: Sheffield University ->
Descripteurs: %TAO-%non-traducteurs %TAO-%Royaume-Uni %transcodage-%japonais>%anglais %recherches-%Royaume-Uni
"Derived from a method of teaching people with little linguistic talent how to 'decode' Japanese texts using a grammar-like dictionary inan 'automaton-like' fashion. The system is based on the direct translation

model of linear predictive analysis." [Hutchins, 'Recent Developments...', p.41]

**ALL-UNION CENTRE COMPUTER DICTIONARY
Fabricant: All-Union Centre ->
Matériel: EC1841 (= PC-XT compatible)
Descripteurs: %dictionnaires-%russe %dictionnaires-%Europe orientale %dictionnaires-%micro

**ANALYSE DES TEXTES EN ETATS FINIS <ATEF>
Conception: Module d'analyse morphologique en grammaire d'états finis pour ARIANE
Descripteurs: %TA-%morphologie

**ANALYSE UND SYNTHESE DES FRANZOSISCHEN MIT COMSKEE <ASCOF>
Fabricant: Universität des Saarlandes ->
Logiciel: Computing and String Keeping Language <COMSKEE>
Conception: "A transfer system incorporating AI-style 'knowledge-based' semantic analysis, aiming for high quality batch translation. The research emphasis has been on the problems of French analysis."
Descripteurs: %TA-%français>%allemand %recherches-%Europe occidentale %connaissance-%Europe occidentale %connaissance-%français>%allemand

**ANGLIISKO I NEMETSKO-RUSKII AVTOMATICHESKII PEREVOD <ANRAP>
Fabricant: All-Union Centre -> \MT.ADD
Importance: A lui seul, ce système assure 50% de toute la TA réalisée actuellement en URSS
Matériel: Gros ordinateur central
Vitesse: 90 pages/heure
Conception: Modulaire. Derivé des systèmes AMPAR et NERPA, et maintenant intégré au système SPRINT.
Applications: 4 sujets seulement
Qualité: Le module anglais-russe est de qualité commercialisable, tandis que le module allemand-russe était encore, en 1988, au stade expérimental
Descripteurs: %TA-%allemand>%russe %TA-%anglais>%russe

**ANGLIISKO-RUSKII AVTOMATICHESKII PEREVOD <ARAP>
Fabricant: All-Union Centre -> \MT.ADD
Lancement: Encore au stade de développement en 1988
Descripteurs: %TA-%anglais>%russe

**AQUILA
Dépositaire: Nexys ->
Descripteurs: %terminologie

**ARCHTRAN (ArchTran)
Fabricants: National Tsing Hua University & Behavior Tech Computer Corp ->
Lancement: En développement depuis 1985
Conception: Transfert par pivot
Applications: Manuels d'informatique et d'entretien aéronautique
Descripteurs: %TA-%anglais>%chinois %TA-%Extrême-Orient %TA-%pivot %TA-%aérospatial %TA-%traitement des données

**ARIANE-85
Fabricant: GETA ->
Lancement: 1971-
Matériel: Mainframe, PC-AT/370, PS2/7437
Conception: Intermediate transfer, modular - *voir aussi* PROTRA, ATEF

Installations: (earlier versions) Universiti Sains Malaysia ->
Descripteurs: %TA-%russe>%français %TA-%allemand>%français %TA-%portugais %TA-%malaisien %TA-%thaïlandais %TA-%pivot %TA-%gros ordinateur %TA-%micro %recherches-%Europe occidentale

**ASERIES TRANSLATION ACCELERATOR <AS TRANSAC>
Fabricant: Toshiba ->
Lancement: English-Japanese operational 1986. Japanese-English under development
Conception: Developed from the TAURUS system. Intermediate transfer
Qualité: Requires postediting
Descripteurs: %TA-%anglais<>%japonais %TA-%Japon %TA-%pivot

**ATELIER DE TRADUCTION ASSISTÉE PAR ORDINATEUR <ATAO>
Fabricant: Claude Bédard ->
Conception: "basée sur le concept nouveau de <prétraduction automatique>"
Descripteurs: %TAO-%Canada

**ATLAS I
Fabricant: Fujitsu ->
Lancement: c. 1985
Matériel: FACOM M180II
Qualité: Not cost-effective when sold to outside users
Descripteurs: %TA-%anglais>%japonais %TA-%Japon %TA-%grammaire des cas %TA-%pivot %TA-%interactif %TA-%préédition %TA-%manuels %TA-%traitement des données %TA-%qualité

**ATLAS II
Fabricant: Fujitsu ->
Lancement: c.1985
Matériel: FACOM M180II
Applications: Fujitsu manuals, material under contract with EEC -> for Japan-Info project. Japanese-German research with University of Stuttgart ->, Japanese-Korean research with Korean Advanced Institute of Science and Technology
Qualité: Requires postediting
"Report of an independent translator's testing of the (...) system (...) at the Fujitsu premises (...) paid tribute to the openness of Fujitsu but was unimpressed by the results." [Kingscott, "Applications of Machine Translation"]
Descripteurs: %TA-%japonais>%anglais %TA-%japonais>%allemand %TA-%japonais>%koréen %TA-%Japon %TA-%qualité %TA-%manuels %TA-%traitement des données %recherches-%Japon

**AUTOMATA TRADUCTOR ALGORITMICO MULITLINGUE INTERACTIVO RECURSIVO INTELIGENTE <ATAMIRI>
Fabricant: Ivan Guzmán de Rojas, Bolivia
Importance "The smallest MT project in the world." -- mais cette déclaration est trop modeste
Lancement: Protype demonstrated in 1985 in Washington DC
Conception: Uses grammar of Aymara (Amerindian language) as formal frame for grammar and lexicon descriptions: grammar can represented as matrix, which allows fast computing and external tables -- so that adding another language only requires loading an external table. Language-independent concept representation in 'Language 0' (not Aymara). Lexical data base of 100K entries for specific sublanguages, divided between various languages; most terminology can be user specific -- only core words cannot be touched by user. Discrimination of polysemy by syntactical considerations without

semantics. Statistical methods used to measure incremental improvement of system
Rendement: Economical because uses language representation based on matrices, not networks. Total development cost, computing and manpower, under $1M.
Qualité: First reactions from translators often sceptical, but users pleased
Installations: English-Spanish system at Panama Canal Commission. Negotiating for installations in Europe
Descripteurs: %TA-%allemand<>%espagnol %TA-%anglais<>%espagnol %TA-%espagnol<>%français %TA-%espagnol<>%hongrois %TA-%espagnol<>%néerlandais %TA-%espagnol<>%suédois %TA-%Amérique latine %TA-%représentation des concepts %TA-%dictionnaires %TA-%pivot %pivot-%aymara %TA-%coût de développement %TA-%évaluation %évaluation-%méthodologie statistique %recherches-%Amérique latine

**AUTOMATED LEXICOGRAPHIC SYSTEM
Fabricant: All-Union Centre ->
Matériel: EC-1055 (= IBM mainframe)
Conception: 200K entries. Takes inflected forms as entries because it does not assume user knows the foreign language. Multilingual with Rus as pivot language
Descripteurs: %banque de terminologie-%multilingue %banque de terminologie-%russe %banque de terminologie-$Europe orientale

**AUTOMATICKY PREKLAD Z ANGLICTINY DO CESTINY <APAC32>
Fabricant: Charles University ->
Logiciel: Systèmes-Q
Descripteurs: %TA-%anglais>%tchèque %recherches-%Europe orientale

**AUTOMATIC LEXICOGRAPHER <ALEX>
Conception: LOGOS module
Descripteurs: %terminologie-%USA

**AUTOMATIC TRANSLATION TYPING PHONE <ATTP>
Fabricant: Toshiba -> \MT.ADD
Conception: "Aiming to allow an English message to be typed into a work station, translated into Japanese, and transmitted by sattelite and vice versa."
Descripteurs: %TA-%anglais<>%japonais %TA-%Japon %TA-%non-traducteurs %recherches-%Japon

**AUTOTERM (AutoTerm)
Conception: Module of TSS. Automatic dictionary lookup of all words in the ST and display in a window.
Rendement: Requires 30K words of translation to make dictionary build-up cost-effective. Increase in output 7-15%
Descripteurs: %terminologie-%USA %terminologie-%productivité

**AVTOMATIZIROVANNYI MASHINNYI PEREVOD S ANGLIISKOGO YAZYKA NA RUSSKII <AMPAR>
Fabricant: All-Union Centre for Scientific & Technical Translation ->
Lancement: 1979
Conception: Maintenant integré avec le système NEPRA dans le complexe SPRINT
Descripteurs: %TA-%anglais>%russe %TA-%Europe orientale

=B

**BANQUE DE TERMINOLOGIE DU QUÉBEC <BTQ>
Fabricant: OLF ->
Matériel: Accessible by dial-up modem directly or via iNet
Conception: "plus de trois millions et demi de termes"
Prix: $200 pa direct. Via iNet $45/hr connect time, Datapac included; Tymnet extra in USA
Descripteurs: %banque de terminologie-%français %banque de terminologie-%Québec %banque de terminologie-%publique

**BILINGUAL KNOWLEDGE BASE <BKB>
Fabricant: BSO ->
Conception: Module of DLT
"Les connaissances du système sont représentées par une banque de textes déjà traduites, dont le contenu linguistique est exploité tel quel et non par le biais d'une distillation conceptuelle humaine. Ce genre d'approche est notamment lié à la notion d'apprentissage: la nouvelle traduction est basée sur l'expérience factuelle accumulée par le système lors des traductions antérieures." [C. Bédard, 'Quoi de neuf en traductique']
Descripteurs: %base de données bitextuelles-%Europe occidentale %base de données bitextuelles-%anglais<>%esperanto<>%français %connaissance-%Europe occidentale %connaissance-%anglais<>%esperanto<>%français %auto-apprentissage

=C

**CALLIOPE-AERO
Fabricant: SITE et GETA ->
Descripteurs: %TA-%français>%anglais %TA-%Europe occidentale %TA-%Aérospatial %TA-%manuels

**CALLIOPE-INFO
Fabricant: SITE et GETA ->
Descripteurs: %TA-%anglais>%français %TA-%Europe occidentale %TA-%manuels %TA-%traitement des données

**CALLIOPE-RÉVISION
Fabricant: SITE and GETA ->
Descripteurs: %PTT-%français %PTT-%Europe occidentale

**CAT 3.0
Fabricant: SynTec ->
Matériel: Eritron multi-user
Système d'exploitation: DCOS, networkable
Conception: Danish, German, English, French, Italian, Dutch, Portuguese, Russian, Spanish, Swedish characters, fixed record format, unlimited record length
Prix: $19K+
Descripteurs: %terminologie-%multilingue %terminologie-%cyrillique %terminologie-%danois %terminologie-%néerlandais %terminologie-%anglais %terminologie-%français %terminologie-%italien %terminologie-%portugais %terminologie-%espagnol %terminologie-%suédois %terminologie-%Europe occidentale

**CLEFBTQ *voir* BTQ

**CLL-2000
Vitesse: 2.5 secs/character
Conception: Reads 2K handwritten Kanji, Hiragana or Katakana characters and converts to ASCII
Descripteurs: %reconnaissance de caractères-%japonais %reconnaissance de caractères-%manuscrit

**COMPARERITE (CompareRite)
Distributeur: Nexys ->
Matériel: PC
Prix: $150
Descripteurs: %comparateur de versions

**CONCEPTUALLY ORIENTED DESIGN ENVIRONMENT «CODE»
Fabricant: Artificial Intelligence Laboratory, University of Ottawa ->
Matériel: IBM 386, Macintosh and SUN mini, with 1M-pixel screen
Langage de programmation: Smalltalk
Descripteurs: %connaissance-%Canada %recherches-%Canada

**CONJUGONS
Fabricant: Camelot-Info ->
Conception: French verb conjugator
Prix: $25
Descripteurs: %conjugueur-%français

**CRITIQUE
Fabricant: IBM ->
Lancement: Research c1985, operational 1988
Matériel: IBM mainframe
Conception: Uses parsing; some off-line processing for 'heavy' parts of analysis
Descripteurs: %correcteur stylistique-%anglais %correcteur stylistique-%USA

**CRITTER
Fabricant: CCRIT ->
Matériel: SUN workstations
Langage de programmation: Prolog ("one of the biggest Prolog programs in the world" [Pierre Isabelle])
Conception: Experimental MT system with shell for dictionary and grammar writing; more in common with European centres and Stanford than with Carnegie Mellon ->; experimenting with speech input
Application: Agricultural market reports
Descripteurs: %TA-%anglais>%français %TA-%Canada %TA-%Agriculture %IA-%Canada %Prolog-%Canada %recherches-%Canada %parole-%Canada

=D

**DEFAULTER
Fabricant: Siemens ->
Conception: Interface between TEAM and METAL
Descripteurs: %terminologie-%Europe occidentale %TA-%terminologie

**DEST WORKLESS WORKSTATION
Fabricant: Lexisystems
Conception: 8 fonts, reads proportional fonts and mixed fonts in different languages, automatically reformats to fit host system
Descripteurs: %reconnaissance de caractères-%multilingue

**DICTIONNAIRE DES INDUSTRIES
Fabricant: CILF ->
Matériel: Accessible via MINITEL
Conception: 36K terms
Descripteurs: %banque de terminologie-%industries %banque de terminologie-%français %banque de terminologie-%Europe occidentale %banque de terminologie-%publique

**DISTRIBUTED LANGUAGE TRANSLATION «DLT»
*Fabricant:*BSO ->
Lancement: Project lifetime 1985-1992, restricted prototype demonstrated 87/12
Conception: Esperanto as interlingua, analogical semantics - *voir aussi* BILINGUAL KNOWLEDGE BASE
"Probably the best-known feature of DLT is its use of Esperanto as an intermediate language... Indeed, DLT is the only MT system which makes systematic and exclusive use of a human language as an interlingual representation. In fact, it may be easier to think of DLT as a double translation system, in which the source text is always translated first into Esperanto, and then from Esperanto into the target language of languages. It is this feature which makes a distributed, or network, apporach to [MT] possible, by making the source and target languages entirely independent of each other."
Descripteurs: %interlingua-%esperanto %recherches-%Europe occidentale %TA-%anglais<>%esperanto<>%français %TA-%interactif %TA-%interlingua %TA-%non-traducteurs

**DOCUCOMP (DocuComp)
Dépositaire: Nexys ->
Matériel: PC, Mac
Prix: $200
Descripteurs: %comparateur de versions

**DUBBED THE VOICE
Fabricant: Advanced Products & Technologies ->
Matériel: Portable (weight 2 lbs), 744K memory, cassette language modules, voice activated, 16-line screen, microphone
Conception: 2K English phrases
Descripteurs: %parole-%anglais>%français %parole-%anglais>%allemand %parole-%anglais>%italien %parole-%anglais>%espagnol %parole-%IA %parole-%portatif %parole-%USA

**DUET
Fabricant: Sharp ->
Descripteurs: %TA-%anglais>%japonais %TA-%Japon

=E

**EDIBASE
Fabricant: Inform II-Microfor ->
Matériel: PC, ?Mac
Prix: $2700
Descripteurs: %terminologie %textes

**EL-FARID
Fabricant: Alif ->
Lancement: 1990

Matériel: micro
Système d'exploitation: DOS
Conception: TdT pour l'arabe, conçu pour une banque de données islamique
Qualité: Très haute qualité de caractères
Descripteurs: %TdT-%arabe %TdT-%Europe occidentale

**ENGPORT
Fabricant: PAHO ->
Descripteurs: %TA-%anglais>%portugais %TA-%organismes internationaux
%TA-%USA %TA-%santé

**ENGSPAN
Fabricant: PAHO ->
Lancement: Implemented 1980-
Matériel: Wang
Conception: *voir* SPANAM
Descripteurs: %TA-%espagnol>%anglais %TA-%organismes internationaux
%TA-%USA %TA-%intégré %TA-%postédition %TA-%TdT %TA-%santé

**EURODICAUTOM
*Fabricant:*EEC ->
Matériel: Accessible via MINITEL
Descripteurs: %banque de terminologie-%multilingue %banque de
terminologie-%Europe occidentale %banque de terminologie-%publique

**EUROTRA
Fabricant: EEC ->
Lancement: 1977-
Conception: Distributed research in numerous centres, intermediate language
composed of Euroversals (= European universals)
Descripteurs: %Eurotra
%TA-%danois<>%néerlandais<>%anglais<>%français<>%allemand<>%grec<>%italien<>
%portugais<>%espagnol %TA-%pivot

=F

**FILIUS
Conception: LOGOS module
Descripteurs: %TA-%postédition %TA-%TdT %PTT-%USA

**FOG (FoG)
Fabricant Cogentex ->
Lancement: 1990
Matériel: Hewlett-Packard 9000 workstation
Système d'exploitation: Environment Canada Forecast Production Assistant
(FPA)
Langage de programmation: Quintus Prolog, C
Conception:
"FoG (...) may constitute one of the first 'industrial' uses of text generation. FoG is of interest to computational linguists for three additional reasons:
- the conceptual input to the text generation process is derived from data that also drive a graphic display on a workstation for forecasters; this determination of text from a selected subset of graphically displayed data represents an important paradigm for the transformation of information;
- conceptual processing results in an 'interlingual' representation,

a kind of deep syntactic structure for both English and French in this sublanguage;
- sentence generation is carried out using a 'streamlined' version of the Meaning-Text linguistic model; this may represent the first time that such a general model has been adapted to the descriptive problems arising in telegraphic sublanguages." [Bourbeau et al. "Bilingual Generation of Weather Forecasts (...)"]

Fundings: Government of Canada interdepartmental AI R&D fund
Applications: Composition of marine forecasts for Canadian Atmospheric Environment Service of Environment Canada
Descripteurs: %génération de texte bilingue-%anglais<>%français %génération de texte bilingue-%Canada %génération de texte bilingue-%interlingua %génération de texte bilingue-%micro %génération de texte bilingue-%Prolog %génération de texte bilingue-%sous-langage %génération de texte bilingue-%météorologie %IA-%Canada

**FREETEXT (FreeText)
Dépositaires: UltiMac bulletin board, tel. 514/339-5451
Matériel: Mac
Prix: free sharevare
Descripteurs: %concordancier

=G

**GÉNÉRAL TAO
Fabricant: John Chandioux ->
Dépositaires: Edit Inc ->
Conception: Bilingual text matching and retrieval. Experimenting with fuzzy matching for Confederation Life
Descripteurs: %textes-%anglais>%français %textes-Québec

**GLOBALINK TRANSLATION SYSTEM «GTS» (formerly TWP) 2.0
Fabricant: Globalink Language Services ->
Dépositaires: Nexys ->
Lancement: 1989
Matériel: PC-XT
Vitesse: 1K wph
Prix: $2000/language pair
Descripteurs: %TA-%anglais>%chinois %TA-%anglais<>%français %TA-%anglais<>%allemand %TA-%anglais<>%espagnol %TA-%français<>%espagnol %TA-%russe>%anglais %TA-%USA %TA-%micro

**GRAMMATIK IV 1.0
Fabricant: Reference Software ->
Lancement: 1990
Matériel: PC with hard disk
Conception:
"Perhaps the best grammar and writing style checker for PCs (...) analyzes sentences for style and word usage, readability, correct capitalization, punctuation, spelling and the use of jargon or clichés (...) [uses] 'parsing', an essential component of the new breed of grammar checkers (...)powerful, flexible, inexpensive and accurate" ["PC Lap Top" 90/8]
Prix: US$99
Descripteurs: %correcteur grammatical-%anglais %correcteur orthographique-%anglais %correcteur stylistique-%anglais %correcteur grammatical-%USA %correcteur orthographique-%USA %correcteur

stylistique-%USA

**GRAMR (GramR)
Fabricant: John Chandioux ->
Dépositaire: Edit Inc ->
Conception: General MT software applied to specific texts
Prix: By negotiation
Descripteurs: %TA-%Canada

**GTS MICRODICTIONARIES
Fabricant: Globalink Language Services ->
Dépositaire: Nexys ->
Descripteurs: %dictionnaires-%allemand %dictionnaires-%espagnol %dictionnaires-%français %dictionnaires-%commerce %dictionnaires-%finances

=H

**HEXAGLOT T1500
Dépositaire: Elveco ->
Matériel: Pocket machine
Conception: 2800 words + 150 phrases per language, Roman and Japanese keyboard, LCD screen, voice synthesizer, "la bonne prononciation avec l'accent du pays". Includes 4K address book ["Information Market" 63.11
Descripteurs: %poche-%Europe occidentale %poche-%anglais<>%français<>%allemand<>%italien<>%japonais<>%espagnol %parole-%poche

**HICAT
Fabricant: Hitachi ->
Qualité: Requires postediting
Descripteurs: %TA-%japonais>%anglais %TA-%Japon

**HUGO
Fabricant: Logidisque ->
Matériel: PC, OS/2, 640K RAM
Système d'exploitation: DOS 3.0
Conception: French spelling checker, compatible with many word processors, checks grammatical agreements. 'Intelligent', «le fruit de plusieurs années de recherche en ergonomie bureautique»
Descripteurs: %correcteur orthographique-%français %correcteur orthographique-%Québec %correcteur orthographique-%ergonomie

**HUMANITIES
Fabricant: University of California at Berkeley
Système d'exploitation: Unix, DOS
Langage de programmation: C
Conception: Builds concordances and dictionaries from full text, counts statistics of frequencies and word lengths, traces syntactic structures; reads Greek text
Descripteurs: %concordancier-%grec %concordancier-%USA %dictionnaires-%USA %recherches-%USA

=I

**INTEGRATION
Conception: module de PTT THIBODEAU
Descripteurs: %terminologie-%Canada

**IT
Fabricant: Summer Institute of Linguistics ->
Matériel: PC
Système d'exploitation: DOS
Conception: Interlinear multilingual word processor
Descripteurs: %TdT-%multilingue %TdT-%USA %TdT-%interlinéaire

=J

**JAPANESE ELECTRONIC DICTIONARY FOR ENGLISH AND JAPANESE
Fabricant: Eight private-sector corporations and Japanese government
Descripteurs: %dictionnaires-%anglais<>%japonais
%dictionnaires-%électronique %dictionnaires-%Japon

**JFT
Fabricant: Chinese Academy of Social Science ->
Conception: *voir* JFY-IV
Descripteurs: %TA-%anglais>%chinois %TA-%esperanto>%chinois
%TA-%français>%chinois %TA-%allemand>%chinois %TA-%russe>%chinois
%recherches-%Extrême-Orient

JFY-IV
Fabricant: Chinese Academy of Social Science ->
Lancement: Presented at MT Summit II conference, expected to be marketed late '91
Conception: Development of JFT
Descripteurs: %TA-%anglais>%chinois %TA-%Extrême-Orient

=K

**KNOWLEDGE-BASED MACHINE TRANSLATION <KBMT>
Fabricant: Center for Machine Translation, Carnegie Mellon University ->
Conception: Modules include DIANA distributed analysis, DIOGENES distributed generation, ONTOS ontology, unification grammar. Approach is to build a model of the conceptual universe of a limited field, and then to apply reasoning in order to resolve ambiguities in the texts.
Descripteurs: %TA-%USA %TA-%anglais>%japonais %connaissance-%USA
%recherches-%USA %recherches-%parole %parole-%USA

**KURZWEIL SERIES 4000
Fabricant: Kurzweil ->
Conception: 40K word dictionary, voice output
Descripteurs: %reconnaissance de caractères-%braille %reconnaissance de caractères-%néerlandais %reconnaissance de caractères-%anglais %reconnaissance de caractères-%français %reconnaissance de caractères-%allemand %reconnaissance de caractères-%italien %reconnaissance de caractères-%norvégien %reconnaissance de caractères-%suédois %reconnaissance de caractères-%USA

=L

**LANGUAGE ASSISTANT Series
Fabricant: MicroTac Software ->
Matériel: PC, 512K RAM, hard disk
Système d'exploitation: DOS 2.0+
Conception: Modules: (1) Translation Assistant - "An easy-to-use interactive translator. It translates words, conjugates verbs, provides gender agreement, and allows you to choose the proper entry when there are multiple translations for a word; works with standard ASCII files. (2) Random House bilingual dictionaries with over 30,000 entries, inserts translations directly into word processing documents with a keystroke, can be altered and added to. (3) Verb conjugator. (4) Grammar help topics. (5) Easy accented character entry
Prix: Under $100
Qualité: The shell is well-designed, but linguistically the translator is too crude for somebody with advanced Spanish. However, it is fair value for the money
Descripteurs: %TAO-%anglais>%français %TAO-%anglais>%allemand %TAO-%anglais>%italien %TAO-%anglais>%espagnol %TAO-%USA %TAO-%micro %TAO-%bas prix

**LANGUAGES OF THE WORLD
Fabricant: Harrap
Dépositaire: Nexys ->
Matériel: disque optique
Système d'exploitation: DOS
Conception: 18 dictionaries, 12 languages, 7M words
Descripteurs: %dictionnaires-%multilingue %dictionnaires-%disque optique

**LARGE INTERNATIONALIZATION OF THE DOCUMENTS BY INTERACTING WITH THEIR AUTHORS «LIDIA-1»
Fabricant: GETA ->
Lancement: 1989 (début du projet)
Matériel: Distributed computer architecture - writer workstation on Macintosh Plus or SE, MT server on IBM-4361 mini
Conception: Personal MT system «PMT» for writers who are not translators. Small corpus from Ariane-G5 user interface (containing some on-line documentation) in HyperCard from, guided language approach, linguistic based, intermediate transfer strategy, dictionary with 2K entries fully worked out
Descripteurs: %TA-%ergonomie %TA-%français>%anglais %TA-%français>%allemand %TA-%français>%russe %TA-%interactif %TA-%pivot %TA-%langage restreint %TA-%micro %TA-MINI %TA-%non-traducteurs %TA-%Europe occidentale %recherches-%Europe occidentale %PTT-%Europe occidentale

**LE CONJUGUEUR
Fabricant: Ad Lib ->
Matériel: PC, Macintosh
Conception: French verb conjugator
Prix: $70
Descripteurs: %conjugueur-%français

**L'ECRIVAIN PUBLIQUE PC
Fabricant: Logisdisque ->
Matériel: PC
Système d'exploitation: DOS
Conception: "le traitement de texte le plus confortable qui soit"

Descripteurs: %TdT-%français %TdT-%Québec

**LE GRAMMARIEN
Fabricant: Logisdisque ->
Matériel: PC
Système d'exploitation: DOS
Conception: "la grammaire intelligente" [ad]
Descripteurs: %correcteur grammatical-%français %correcteur grammatical-$Québec

**LE ROUTIER
Fabricant: CLC ->
Lancement: 1989
Matériel: Macintosh
Langage de programmation: Prolog
Conception: Dedicated system for translating Canada Post Corporation route manuals; integrated postediting
Descripteurs: %TA-%Canada %TA-%anglais>%français %TA-%grammaire des cas %TA-%transfert direct %TA-%postédition %TA-%Prolog %TA-%sous-langage %TA-%manuels

**LE TERMINOLOGUE
Fabricant: Blumen ->
Lancement: 1979
Matériel: Macintosh or PC with hard disk or CD, network compatible
Conception: Terminology file manager. Up to 1M entries, 30K characters per entry, multiple sub-files with 'hypertext' capability allowing the compilation of a complete 'dossier terminologique'
Prix: $995, special terms for universities
Descripteurs: %terminologie-%Canada

**LEXFILE *voir* MTX

**LEXIS
Fabricant: Bundessprachenamt ->
Descripteurs: %banque de terminologie-%allemand %banque de terminologie-%Europe occidentale %banque de terminologie-%forces armées

**LOGIC-PROGRAMMING-BASED MACHINE TRANSLATION <LMT>
Fabricant: IBM ->
Lancement: Prototype presented at MT Summit II 1989
Descripteurs: %TA-%anglais<>%danois %TA-%anglais>%français %TA-%anglais<>%allemand %TA-%anglais>%espagnol

**LOGOS
Fabricant: Logos Corp ->
Matériel: Wang VS model 65 and up, IBM mainframes or minis
Système d'exploitation: VM/CMS, MVS, Unix
Vitesse: 2K-8K wph = approx 100 pages/hour in batch mode, according to type of text *Conception:* SEMANTIC ABSTRACTION LANGUAGE, AUTOMATIC LEXICOGRAPHER, FILIUS workstation; postediting, specialized dictionary maintenance, some interactive preediting
Qualité: Requires postediting
Prix: Licensed @ $100K/yr, discounts for multiusers
Installations: Hewlett Packard (Europe), IBM Germany, Nixdorf, Secrétariat d'Etat du Canada ->
Descripteurs: %TA-%anglais>%français %TA-%anglais<>%allemand %TA-%anglais>%espagnol %TA-%allemand>%français %TA-%USA %TA-%gros

ordinateur %TA-%dictionnaires %TA-%postédition %TA-%préédition %préédition-%interactif %TA-%forces armées %TA-%scientifique et technique %textes-%USA

=M

**MACROCAT (MacroCAT)
Fabricant: World Communications Corp (formerly called Weidner and now dissolved)
Dépositaires: TAO International ->
Matériel: (PDP-11) ITT, VAX, MicroVAX II minis
Vitesses: 4-8K wph = 16-32 pages/hour raw, 1K wph postedited
Conception: Online dictionary maintenance, integrated WP, CAT mode; Perkins Engines use raw with controlled English input
Installations: Aérospatiale, Bote, Bull, ITT ->, Matra, Télésystèmes, Thomson, Perkins Engines ->, Rank Xerox, Siemens ->
Productivité Aérospatiale registered 50% increase in productivity
Descripteurs: %TAO-%USA %TA-%anglais>%arabe %TA-%anglais<>%français %TA-%anglais<>%allemand %TA-%anglais>%italien %TA-%anglais>%portugais %TA-%anglais<>%espagnol %TA-%mini %TA-%USA %TA-%langage restreint %TA-préédition %TA-%postédition %TA-%TdT %langage restreint-%Royaume-Uni %productivité-%Europe occidentale

**MAX EXPERT EDITOR
Fabricant: Smart Communications ->
Conception: Spelling and grammar checker for use in conjuction with other Smart sytems
Descripteurs: %correcteur grammatical-%anglais %correcteur orthographique-%anglais

**MECHANICAL TRANSLATION AND ANALYSIS OF LANGUAGE <METAL>
Fabricant: Siemens and University of Texas at Austin ->
Matériel: Symbolics 3670 or 3640 LISP machine
Langage de programmation: Zetalisp, incorporated in LITRAS workstation
Vitesses: 200 pages/day
Conception: Fail-safe heuristics for enhanced disambiguation
Qualités Requires postediting
Descripteurs: %TA-%LISP %TA-%Europe occidentale %TA-%néerlandais<>%français %TA-%anglais<>%allemand %TA-%allemand>%espagnol %reconnaissance de caractères-%Europe occidentale %reconnaissance de caractères-%allemand %terminologie-%Europe occidentale %terminologie-%allemand>%anglais %TA-%PTT

**MELTRAN
Fabricant: Mitsubishi Electric, Japan
Descripteurs: %TA-%japonais %TA-%Japon

**METEO2
Fabricant: Programmed and maintained by John Chandioux for Environment Canada ->
Lancement: English-French operational 1983, French-English 1989
Langage de programmation: GrammR
Vitesses 30K words/day = 8.5M words/year
Conception: Dictionary of 2500 words and expressions; direct input/output from/to weather bureau communications network; self-diagnostic, with reports on failures; screen monitor for untranslated sentences; dedicated to a single controlled sublanguage
"A classic example of well suited machine translation: task specific,

limited vocabulary and repetitive-task situations." ["I'M", 1990]}
Descripteurs: %TA-%Canada %TA-%anglais<>%français %TA-%langage restreint %TA-%météorologie %TA-%sous-langage

**MICROCAT (MicroCAT)
Fabricant: Originally produced by Weidner; rights bought by Intergraph
Dépositaires: DOS version still distributed by TAO Canada -> ["Circuit" 30.Q4]
Matériel: "The oldest MT system running on a PC."
Système d'exploitation: New Unix version developed by Intergraph
Vitesse: 1K wph
Prix: $18K
Descripteurs: %TA-%anglais<>%français %TA-%anglais>%allemand %TA-%anglais>%italien %TA-%anglais>%portugais %TA-%anglais<>%espagnol %TA-%micro %TA-%USA

**MICRO-PACK J/E II
Fabricant: Bravice ->
Lancement: 1984
Prix: $5K
Descripteurs: %TA-%japonais>%anglais %TA-%Japon %TA-%micro

**MINI-PACK
Fabricant: Bravice ->
Lancement: 1984
Matériel: DEC mini
Système d'exploitation: Unix
Descripteurs: %TA-%japonais>%anglais %TA-%Japon %TA-%mini

**MINITEL
Fabricant: French and Belgian telephone administrations
Matériel: Minitel terminals
Conception: French and Belgian public access network
Banques de données et services: SYSTRAN from GACHOT ->, DICTIONNAIRE DES INDUSTRIES, EURODICAUTOM, NORMATERM
Descripteurs: %TA-%Europe occidentale %TA-%français %TA-%publique %publique-%Europe occidentale

**MORFIX (MorFix)
Fabricant: Ink ->
Conception: English morphology analyser and generator
Descripteurs: %TAO-%anglais %TAO-%Europe occidentale

**MTX 2.0 (formerly Mercury in USA, Termex in Canada and Europe)
Lancement: 1989
Fabricant: Linguatech ->
Dépositaires: Canadian distributor Bytetown Consulting ->. European distributor Eurolux Computer, Luxemburg
Matériel: PC, hard disk with 500K for program modules + space for vocabularies
Système d'exploitation: DOS 2.0+, networkable
Conception: Memory-resident terminology file manager, keyboard driver with extended ASCII characters (Cyrillic also available), free record format, language direction reversible, file size limited only by disk space and DOS, entry terms up to 60 characters, entries up to 1900 characters divided into any number of fields, alphabetical sort. Compatible with WordPerfect, MultiMate, Visio 4, Volkswriter 3, XYWrite III, Word, Word Want, Palantir 3, WorldWriter; direct copying from dictionary to text. Prepared glossaries

available in LEXFILE format; also Harrap's English-French Dictionary and several Collins dictionaries
Prix: $400
Descripteurs: %terminologie-%cyrillique %terminologie-%multilingue %terminologie-%micro %terminologie-%USA

**MTX FRANÇAIS
Lancement: 1991
Fabricants: Linguatech (USA) et Tetracom (Canada) ->
Matériels: micros
Conception: version française de MTX
Prix: pas encore fixé
Descripteurs: %terminologie-%français %terminologie-%micro %terminologie-%Québec %terminologie-%USA

**MU-2
Fabricant: Japan Information Centre for Science and Technology ->
(Initially University of Kyoto -> under contract with MITI 1982-86)
Lancement: Prototype testing 1990, operational ?1991
Conception: Dictionary with 300K entries
Qualité: Requires postediting
Descripteurs: %TA-%anglais>%japonais %TA-%Japon %TA-%documentation

**MULTILINGUALE ASPEKTE VON REFERENZ-INFORMATIONS-SYSTEME <MARIS>
Fabricant: Universität des Saarlandes ->
Conception: Application of SUSY 2 to data bases
Descripteurs: %TA-%documentation

**MULTITERM (MultiTerm) 1.0
Fabricant: Trados ->
Matériel: PC, hard disk, 640K RAM, EGA/VGA card
Système d'exploitation: DOS 2.11+, networkable
Conception: Terminology file manager, extended ASCII characters, English & German user overlays, free record format - *voir aussi* TEXT-ANALYZER
Prix: $1K
Descripteurs: %terminologie-%multilingue %terminologie-%Europe occidentale %terminologie-%micro

=N

**NORMATERM
Fabricant: AFNOR ->
Matériel: Accessible via MINITEL
Descripteurs: %banque de terminologie-%français %banque de terminologie-%Europe occidentale %banque de terminologie-%publique

**NONVERBAL REASONING AND LANGUAGE UNDERSTANDING SYSTEM <NORLUS>
Fabricant: Norlus ->
Conception: conceptual transfer model and interlingua
Descripteurs: %TA-%pivot %TA-%Canada %recherches-%Canada

=O

**ODA
Fabricant: Centre for International Cooperation for Computerisation ->
Vitesse: (projected) 5K wph

Conceptions: Japanese dictionary of 200K words already complete, Chinese dictionary of 10K words still incomplete, Malay dictionary of 10K words (incomplete), Thai dictionary of 5K words (incomplete). Uses Esperanto as interlingua.
Descripteurs: %TA-%chinois<>%japonais %TA-%indonésien<>%japonais %TA-%japonais<>%malaisien %TA-%japonais<>%thaïlandais %TA-%Extrême-Orient %TA-%Japon %recherches-%Japon %interlingua-%esperanto

**OMNIPAGE
Dépositaires: Nexys ->
Conceptions: Scanner
Prix: $1000
Descripteurs: %reconnaissance de caractères

**ORTHOGRAF PLUS
Dépositaires: Camelot-Info ->
Matériels: PC
Conceptions: French spelling checker
Prix: $95-195
Descripteurs: %correcteur orthographique-%français

**The OXFORD ENGLISH DICTIONARY
Dépositaires: Nexys ->
Matériels: disque optique
Conceptions: 252K entries, 1.8M quotations, 42M words of text
Prix: $1,500
Descripteurs: %dictionnaires-%anglais %dictionnaires-%disque optique

=P

**PC-TRANSLATOR 3.1
Fabricants: Linguistic Products ->
Matériels: PC-XT, 40K RAM, 3Mb disk; monochrome, CGA, VGA or EGA display
Conceptions:
"New, easy installation program, pull-down menus, enhanced dictionaries, unlimited phrase capacity, multiple phrase dictionary search, interactif dictionaries with 'wild cards' in phrase entries, unlimited user dictionary capacity, multiple user dictionary search, program creates 'automatic dictionary' of unknown words, supports Lotus/Intel expanded memory, new 'mini-editor' feature"
Qualités: "Ce logiciel est rudimentaire sur le plan linguistique" ["Circuit" 30.Q5]
Prix: US$895 per language direction inc. free Norton Editor
Descripteurs: %TA-%micro %TA-%USA %TA-%anglais<>%danois %TA-%anglais<>%français %TA-%anglais<>%espagnol %TA-%anglais<>%suédois %TA-%bas prix

**PENSEE
Fabricants: Oki Electric ->
Descripteurs: %TA-%anglais<>%japonais %TA-%Japon

**PHENIX
Dépositaires: Nexys ->
Conceptions: Terminology file manager
Descripteurs: %terminologie

**PIVOT
Fabricant: NEC ->
Qualités: Requires postediting
Descripteurs: %TA-%anglais<>%japonais %TA-%Japon

**POST EDITING KNOWLEDGE USING SYSTEM <PEKUS>
Fabricant: University of Osaka Prefecture ->
Lancement 1988
Conception:
"In order to identify the sort of correction that has been made in a TL expression, PEKUS needs a simple syntactic analyzer of the TL at least. Thereby PEKUS tries to identify the transfer rules and words of the TL to be corrected in the MT system.. and traces the original transfer process in the reverse direction... the corresponding rewrite rule is checked and the inappropriate part is identified." [Abstract]
Descripteurs: %TA-%japonais>%anglais %TA-%Japon %TA-%auto-apprentissage %recherches-%Japon %postédition-%japonais>%anglais: 11-29-90

**PROFILEX 3.75
Fabricant: Horst Gabriel ->
Matériel: PC, hard disk, 640K RAM
Système d'exploitation: DOS 3.0+, networkable
Conception: Unlimited dictionary size, anti-dictionary, language direction reversible; extended ASCII characters (Cyrillic, Greek, Turkish also available); fixed user-definable record format; English, French, German user overlays
Prix: $750
Descripteurs: %terminologie-%Bilingual %terminologie-%cyrillique %terminologie-%grec %terminologie-%turc %terminologie-%micro %terminologie-%Europe occidentale

**PROTRA
Fabricant: GETA ->
Conception: Operational offshoot of ARIANE
Descripteurs: %TA-%français %TA-%Europe occidentale

**PTT 1.1
Fabricant: CCRIT ->
Lancement: Still on trial for Secretary of State after 1 year initial delay, 1990; report soon
Matériel: PC/AT, disque optique
Conception: WordPerfect with spell checker and thesaurus, small Harrap's dictionary, Termex, Termium on CD-ROM
Descripteurs: %PTT-%Canada %PTT-%anglais<>%français %dictionnaires-%anglais<>français %correcteur orthographique-%français %thésaurus-%français %terminologie %banque de terminologie-%anglais<>français

**PTT 2.0
Fabricant: CCRIT ->, Under development with Educational Software <EDS>, Toronto
Conception: Online dictionaries, eg Cobuild, Multidictionnaire, to be added with single integrated interface. Interested in incorporating tools for sublanguages; automated aid for terminology scanning that would pick out compound terms
Descripteurs: %sous-langage-%Canada %terminologie-%Canada

**PTT THIBODEAU
Fabricant: Michel Thibodeau ->
Matériel: Mac Plus with hard disk, 2Mb RAM, system version 6.0.2, extended keyboard
Conception: 2 versions - «clés en main», «faite-le vous-même». WP: WordPerfect 1.1 (but another can be substituted). DBMS: FileMaker II. Special keyboard configurations; accented characters by ImageWriter. Shareware concordance builder. Can interrogate term banks by modem but does not have CD-ROM. "La fonction terminologique est étroitement intégrée au traitement de texte." [Claude Bédard, `La solution Thibodeau (...)'] 2 independent modules: INTEGRATION for terminology, REGISTRE for MIS ["Circuit" 30.Q10]
Descripteurs: %PTT-%Canada %terminologie-%Canada %SIG-%Canada

=R

**RIGHTWRITER (RightWriter)
Fabricant: Rightsoft ->
Lancement: 1989
Conception: Grammar checker
Prix: US$95
Descripteurs: %correcteur grammatical-%anglais %correcteur grammatical-%USA

**RMT
Fabricant: Ricoh ->
Descripteurs: %TA-%japonais %TA-%Japon

**Le ROBERT ELECTRONIQUE
Fabricant: Dictionnaires Le Robert ->
Dépositaires: Canadian distributors (non-exclusive): Services Documentaires Multimedia ->, Nexys ->
Matériel: PC-XT, -AT, 512K RAM (256K without citations), DOS 3.1+, Microsoft MS-DOS CD-ROM extension, HDD or 3.5" FDD or 5.25"FDD, CGA/EGA/VGA monochrome or colour card
Conception: CD-ROM version of ***Le Grand Robert*** in 9 vols., 80K entries, 1M synonym references, etymologies, pronunciations, citations; verb conjugator generating 450K forms; bibliographical appendix with 2K references. Memory resident; direct insertion in WP text; search by partial/mispelled words, pronunciations. Verb conjugation generating 450K forms
Prix: $1500
Descripteurs: %conjugueur-%français %dictionnaires-%Europe occidentale %dictionnaires-%français %dictionnaires-%disque optique

**ROSETTA3
Fabricant: Philips ->
Lancement: 1985-
Descripteurs: %TA-%anglais<>%néerlandais %TA-%néerlandais<>%espagnol %TA-%Europe occidentale %recherches-%Europe occidentale

**ROSETTA4
Fabricant: Philips ->
Lancement: c.1989
Descripteurs: %TA-%Europe occidentale

**ROSETTA
Dépositaires: Canadian distributor Bytetown Consulting ->
Matériel: PC

Prix: $1300
Descripteurs: %système d'information à la gestion

=S

**SAARBRUCKER UBSERSETZUNGSSYSTEM «SUSY 2»
Fabricant: Universität des Saarlandes ->
Conception: *voir* MARIS, SATAN, SUSANNAH, SUSY-BSA
Descripteurs: %Eurotra %TA-%danois>%allemand %TA-%néerlandais>%allemand %TA-%anglais<>%allemand %TA-%esperanto>%allemand MT-%français<>%allemand

**SAARBRUCKER AUTOMATISCHE TEXT-ANALYSE «SATAN»
Fabricant: Universität des Saarlandes ->
Conception: Application of SUSY 2 to automatic indexing
Descripteurs: %textes-%allemand

**SELECTERM
Fabricant: ALP Systems ->
Conception: Module of TSS
Descripteurs: %terminologie-%USA

**SEMANTIC ABSTRACTION LANGUAGE «SAL» *voir* SEMANTHA
Fabricant: Logos Corp ->
Conception: LOGOS utility, user version of Semantic Abstraction Language
Descripteurs: %sémantique-%USA

**SHALT
Fabricant: IBM Japan ->
Langage de programmation: LISP
Conception: Prototype intermediate transfer system
Applications: IBM manuals
Qualité: Requires postediting
Descripteurs: %TA-%anglais>%japonais %TA-%Japon %TA-%manuels %TA-%LISP %TA-%traitement des données %TA-%pivot

**SILOD
Fabricant: Pedagogical Institute, Leningrad ->
Lancement: Modules anglais-russe et français-russe déjà commercialisables; modules russe-anglais et espagnol-russe encore expérimentales (1988)
Descripteurs: %TA-%anglais<>%russe %TA-%espagnol>%russe %TA-%français>%russe %TA-%Europe orientale %recherches-%Europe orientale

**SMART TRANSLATOR
Fabricant: Smart Communications ->
Matériel: IBM 370 mainframes, VAX minis
Vitesse: Claims 200K wph on mainframes
Conception: Screen postediting; dedicated applications. *Installations:* Manpower & Immigration Canada ->. Tested unsuccessfully by University of Moncton for Lexi-tech 1986
Qualité:
"Complaints were quite rare, and usually only from pedantic teachers (...) hardly ever because the [job vacancy] description was misleading." [Kingscott, "Applications of Machine Translation", p.28]
Descripteurs: %TA-%anglais>%français %TA-%anglais>%allemand %TA-%anglais>%italien %TA-%anglais>%japonais %TA-%anglais>%espagnol %TA-%USA %TA-%langage restreint %TA-%gros ordinateur %TA-%mini %TA-%postédition %TA-%qualité %TA-%TdT %TA-%administration

**SPANAM
Fabricant: PAHO ->
Lancement: Research 1976-79, implementation 1979-
Matériel: IBM mainframe
Vitesse: 6500 words/translator/day revised
Conception: Integrated WP
Productivité: 2-3 x unassisted rate
Qualité: Post-edited output rated slightly higher than unassisted HT; clients choose whether to use system and can ask for HT if dissatisfied. sa ENGSPAN
Descripteurs: %TA-%anglais>%espagnol %TA-%organismes internationaux %TA-%USA %TA-%transfert direct %TA-%postédition %TA-%productivité %TA-%qualité %TA-%TdT %TA-%santé

**SUPERLEX 1.8
Dépositaires: (Canada) Nexys, (Europe) Chris Blowers ->
Matériel: PC, hard disk, 512K RAM
Système d'exploitation: DOS 2.11+, networkable
Conception: Terminology file manager, copy protected, extended ASCII characters; English, French, German user overlays; 60K entries per glossary, fixed user-definable record format, language direction reversible
Prix: $300
Descripteurs: %terminologie-%Bilingual %terminologie-%micro

**SUSANNAH
Fabricant: Universität des Saarlandes ->
Conception: Module of SUSY 2 for incorporating outside terminology information
Descripteurs: %TA-%terminologie %terminologie-%Europe occidentale

**SUSY-BSA
Fabricant: Universität des Saarlandes ->
Conception: Application of SYSY 2 restricted to Bundessprachenamt texts
Descripteurs: %sous-langage-%allemand

**SWP-7800
Fabricant: Sanyo Electric ->
Descripteurs: %TA-%japonais %TA-%Japon

**SYSTRAN
Fabricant: Systran Translation Systems ->
Lancement: Operational 1970
Matériel: IBM mainframes. . Accessible par MINITEL
Système d'exploitation: Unix
Vitesse: 500K words/hr = 26 pages/min. 18 million words/yr at Wright-Patterson Air Force Base
Conception: Large dictionaries including phraseology and some syntax and semantics, and tailored to clients; interfaced with OCR and WP. First-generation technology but...

> "One of the reasons why Systran has held its own at the head of the machine translation field (...) is (...) the richness of its dictionaries, built up over so many years. The systems is sometimes criticized as an 'old' system, but in fact it has been so modified and adapted (...) that it can be regarded as a current system." [Kingscott, "Applications of Machine Translation"]

Qualité: Raw output is used for intelligence scanning; otherwise requires postediting
Installations: Deutsche Bundesbahn, EEC, GM Canada, ITC (Delft) NATO, USAF

->, Xerox ->; Dornier, Euratom Nuclear Research Centre (Karlsruhe), Festo, NASA
Descripteurs: %TA-%anglais>%arabe %TA-%anglais>%néerlandais %TA-%anglais<>%français %anglais<>%allemand %TA-%anglais>%italien %TA-%anglais<>%japonais %TA-%anglais>%portugais %TA-%anglais>%espagnol %TA-%français>%néerlandais %TA-%français<>%allemand %TA-%français>%italien %TA-%russe>%anglais %TA-%multilingue %TA-%Canada %TA-%Europe occidentale %TA-%USA %TA-%dictionnaires %TA-%transfert direct MT-%gros ordinateur %TA-%reconnaissance de caractères %TA-%postédition %TA-%publique %TA-%TdT %TA-%aérospace %TA-%automobile %TA-documentation %TA-%renseignements %TA-forces armées %TA-%industries %TA-%publique

**SYSTEME D'INFORMATION OPERATIONNELLE «SIO» = Operational Information System «OIS»
Fabricant: Secrétariat d'Etat du Canada ->
Lancement: 1986
Descripteurs: %SIG-$Canada

**SZEGED UNIVERSITY ENGLISH-HUNGARIAN AUTOMATIC TRANSLATION «SZEHAT»
Fabricant: Université Attila Josef ->
Descripteurs: %TA-%anglais>%hongrois %TA-$Europe orientale

=T

**TEAM
Fabricant: Siemens ->
Conception: Uses ISO MATER format, sa DEFAULTER
Descripteurs: %banque de terminologie-%allemand %banque de terminologie-%Europe occidentale

**TED
Fabricant: Trados ->
Conception: Split screen for parallel display of source text and translation, automatic translation of terms found in dictionary, RAM-resident version
Descripteurs: %TAO-%Europe occidentale

**TELEPHONE INTERPRETER
Fabricant: British Telcom ->
Lancement: Prototype exhibited 1987
Matériel: Merlin 5200 PC
Conception: 400 word dictionary limited to business phrases, recognizes and transmits proper names
Descripteurs: %recherches-%parole %recherches-%Royaume-Uni %parole-%allemand<>%anglais %parole-%anglais<>%italien %parole-%anglais<>%espagnol %parole-%anglais<>%suédois %parole-%Royaume-Uni %parole-%commerce

**TERMEX *voir* MTX

**TERMIUM III
Fabricant: Bureau de la traduction, Secrétariat d'Etat du Canada ->
Matériel: VAX. Accessible by dial-up model or on CD-ROM
Prix: $1100 pa on CD-ROM. No further dial-up subscriptions currently available
Descripteurs: %banque de terminologie-%anglais<>%français %banque de terminologie-%multilingue %banque de terminologie-%Canada

%terminologie-%disque optique %disque optique-%Canada

**TERMINO
Fabricant: Université du Québec à Montréal ->
Conception: Prototype French term scanner
Installations: Under development for Office de la langue française
Descripteurs: %terminologie-%Canada

**TERM-LIDAS B
Fabricant: Software Design ->
Matériel: PC-AT and larger machines, hard disk, 640K RAM, multi-user
Système d'exploitation: DOS 2.1+, OS/2, Unix 2.2+, VMS, networkable
Conception: Extended ASCII characters, fixed record format
Prix: $2200
Descripteurs: %terminologie-%multilingue %terminologie-%Europe occidentale %terminologie-%micro %terminologie-%mini

**TERM-PC 2.0
Fabricant: Siemens ->
Matériel: PC-AT, hard disk, 640K/3MB RAM, mouse, multi-user
Système d'exploitation: DOS 3.2+, Windows 1.03+, Sinix 2.1+, Facet, networkable.
Conception: Extended ASCII characters; English, German user overlays; fixed standard and user-definable record formats, unlimited record length. sa TERTRANS
Prix: $2K
Descripteurs: %terminologie-%multilingue %terminologie-%Europe occidentale %terminologie-%micro

**TERMTRACER (TermTracer) 1.2
Fabricant: Ink ->
Matériel: PC, hard disk, 640K RAM
Système d'exploitation: DOS 3.0+, networkable
Conception: Terminology file manager, language direction reversible, extended ASCII characters, fixed record format, RAM-resident
Prix: $300
Descripteurs: %terminologie-%Bilingual %terminologie-%Europe occidentale %terminologie-%micro

**TERM-TRANS (Term-Trans)
Fabricant: Siemens ->
Conception: Bridging software between PC-TERM and word processors
Descripteurs: %terminologie-%Europe occidentale %TdT-%Europe occidentale

**TEXT-ANALYZER
Fabricant: Trados ->
Conception: Term scanner working in conjunction with MUTLTITERM
Descripteurs: %terminologie-%Europe occidentale

**TEXTSEARCH (TextSearch)
Dépositaire: Bytetown Consulting ->
Matériel: PC
Prix: $65
Descripteurs: %concordancier

**TEXTOOLS (TexTools)
Fabricant: Ink International ->
Conception: Software package for translators, includes a concordance

builder
Installations: Centre de traduction et de terminologie juridiques, Moncton
Descripteurs: %concordancier-%Europe occidentale %terminologie-%Europe occidentale

**TITUS 4
Fabricant: Institut du Textile de France ->
Lancement: Implemented 1980
Conception: Requires trained pre-editors for interactif checking of errors and ambiguities in controlled input language; vocabulary restricted to subset of textile terminology; binary form pivot language
Descripteurs: %TA-%anglais<>%français<>%allemand<>%espagnol %TA-%Europe occidentale %TA-%pivot %TA-%interactif %TA-%langage restreint %TA-préédition %TA-%sous-langage %TA-%documentation %TA-%textile

**TOOLKIT
Fabricant: Bravice ->
Lancement: Not yet released 1990
Descripteurs: %TAO-%japonais %TAO-%Japon

**TOVNA MTS
Fabricant: Tovna ->
Dépositaires: North American distributor TTI Inc ->
Lancement: Marketed 1987
Matériel: SUN 3-60
Vitesse: 3600 wph
Conception:
"Se présente comme un concurrent direct de LOGOS. Il se signale par une informatique plus légère et par des facultés d'apprentissage plus poussées." "Ne répète pas ses erreurs et apprend à traduire selon votre style." ["Circuit" 30.Q4].
"Learns from actual use, i.e. it remembers modifications to its original suggested translation made by the operator and implements them for future texts." [Kingscott, "Applications of Machine Translation"]
Prix: $150K
Descripteurs: %TA-%Moyen-Orient %TA-%anglais>%français %TA-%auto-apprentissage

**TRANSACTIVE
*Fabricant:*ALP Systems ->
Conception: Module of TSS. Interactive, requiring translator intervention at analysis stage to resolve ambiguities and polysemy
"To use Transactive successfully takes a great deal of perseverance and time" [Kingscott, "Applications of Machine Translation"]
Installations: NATO ->, Statistics Canada
Descripteurs: %TA-%interactif %TA-%anglais>%FR

**TRANSLATE
Fabricant: Finalsoft Corp ->
Conception: Translates ASCII files. 85K word dictionary with user update and maintenance. Split screen displays ST and TT. "The manual (...) recommends English sentence structures that yield the best possible translation."
Prix: US$495, free user support
Descripteurs: %TA-%anglais>%espagnol %TA-%USA %TA-%langage restreint %TA-%micro

**TRANSLATION SUPPORT FACILITY <TSF>
Fabricant: IBM European Language Services ->
Lancement: Developed 1989
Système d'exploitation: OS2, necessary for multitasking
Conception: Kernel based on ALPNET linguistic engine. General dictionaries and IBM's own terminology accessible, with base form reduction
"Another translation aid is that if a sentence in the source language has previously been translated, the system will identify it and bring up on to the screen the previous version.
Research was done at BikerØd in the summer of 1988 by a student from Copenhagen University (...) on the degree of repetition in IBM manuals, both from one version of a product to the next, and between the manual for one product and that for another. [Chart shows average 15% repetition within a manual, 50% across manuals]
This showed the utility of the repeated sentence identification facility, but a further problem was then identified. This is that the writer of the second manual or version often used a slightly variant wording. The solution found for this was to create something called 'fuzzymatch', which identified not only identical sentences but also 'near hits'. Examples (...) 'Type the text you want to center' and 'type the text you want centered.'" ["LI" 1:6.6-7 (Dec 1989)]
Descripteurs: %base de données bitextuelles-%Europe occidentale %base de données bitextuelles-%multilingue %TAO-%Europe occidentale %TAO-%multilingue %TAO-%manuels %TAO-%traitement des données %dictionnaires-%Europe occidentale %dictionnaires-%multilingue %terminologie-%Europe occidentale %terminologie-%multilingue %PTT-%multilingue %PTT-%Europe occidentale

**TRANSLATION SUPPORT SYSTEM <TSS> 4.4.1
Fabricant: ALP Systems ->
Matériels: (DG MV-4000)
Système d'exploitation: OS/2 (speeds up interactive operations by allowing work on following sentences while current one still being processed)
Conception: Three levels of function (see SELECTERM, AUTOTERM. TRANSACTIVE) the higher encompassing all the features of the lower ones
Installations: ALPNET offices and subsidiaries, Coventry Polytechnic, L & L Gebruikers Informatie, NCR France, NATO, Norsk Data, Rank Xerox, Texas Instruments, Union Bank of Switzerland
Descripteurs: %Brigham Young %TAO-%anglais<>%français %TAO-%anglais<>%allemand %TAO-%anglais>%italien %TAO-%anglais>%espagnol %TAO-%USA %TA-%anglais<>%français %TA-%anglais<>%allemand %TA-%anglais>%italien %TA-%anglais>%espagnol %TA-%USA %TA-%préédition %TA-%postédition %TA-%TdT

**TRANSTAR
Lancement: ?1990:
Fabricant: China Software ->
Descripteurs: %TA-%anglais>%chinois %TA-%Extrême-Orient

**TWP *voir* GTS

=V

**VOLKSWRITER 3.2
Fabricant: Volkswriter ->
Conception: "Up to 11 different language dictionaries as bolt-on options" ["Language International"]

Descripteurs: %dictionnaires-%Europe occidentale %TdT-%Europe occidentale %TdT-%multilingue

=W

**WINGER 92
Fabricant: Winger Holdings ->
Conception:
"Winger (...) developed a database with a highly efficient method of storage and access (...) called Reduced Information Datastructure. The application for language translation seemed a useful development (...) So far little grammar seems to have been put into the system, although verbs are inflected; but homographs are recognised, and the operator is given a choice of possible meanings, and invited simply to delete those which are inapplicable." [Kingscott, "Applications of Machine Translation"]
Descripteurs: %TA-%Europe occidentale %TA-%anglais>%danois %TA-%interactif %TA-%connaissance %TA-%textile %interactif-%Europe occidentale %KNOWLDEGE-%Europe occidentale

**WORD
Fabricant: Microsoft
Conception: The preferred word processor for Macintoshes
Descripteurs: %TdT-%USA

**WORDCOUNT (WordCount)
Fabricant: Pancom ->
Matériel: PC
Prix: US$111.00
Conception: Counts keystrokes, words, lines in ASCII files
Descripteurs: %compte-mots-%USA

**WORDCRUNCHER (WordCruncher)
Dépositaires: Nexys, Bytetown Consulting ->
Matériel: PC
Conception: Concordance builder
Prix: $300
Descripteurs: %concordancier

**WORDFINDER (WordFinder)
Dépositaires: Camelot-Info ->
Matériel: PC, Mac
Conception: English, French synonym finders
Prix: $70
Descripteurs: %synonymes-%anglais %synonymes-%français

**WORDFIT
Fabricant: UK
Conception: Postsynchronizes dubbing on original sound and extends the dubbing to fit the original sound bursts
Descripteurs: %doublage-%Royaume-Uni

**WORDPERFECT 5.0 FRANCAIS
Fabricant: WordPerfect Corp ->
Matériel: PC, Mac, hard disk
Conception: Sophisticated word processor, RAM-resident spelling checker and thesaurus. Most popular word processor among Canadian translators

Prix: $350
Descripteurs: %TdT-%français %TdT-%USA %comparateur de versions-%français %correcteur orthographique-%français %thésaurus-%français

**WORDPERFECT 5.1
Fabricant: WordPerfect Corp ->
Matériel: PC, Mac, hard disk
Conception: Sophisticated word processor, RAM-resident spelling checker and thesaurus. Most popular word processor among Canadian translators
Prix: $350
Descripteurs: %TdT-%anglais %TdT-%USA %comparateur de versions-%anglais %correcteur orthographique-%anglais %thésaurus-%anglais

=X

**XLT
Fabricant: Socatra ->
Lancement: Presented at Montreal International Computer and Office Exhibition 1990
Matériel: 80836 micros
Système d'exploitation: DOS
Vitesse: 250K words/hr
Conception: XLT = assembly language word for 'translate'. Single and multi-user program. Claims to use AI and fuzzy logic.Marketed as productivity tool, not MT. Full-form dictionary with 40K lexemes = 200K forms on hard disk
Prix: User needs special access smartcard bearing password and amount of words paid for, "traduction à la carte" ["Circuit" 30.Q12]: 100K-1M words @ 2-3c/word, minimum $5K. "Le seul système commercial de TA de conception canadienne" ["Circuit" 30.Q5]
Descripteurs: %TA-%Canada %TA-%anglais>%français %terminologie-%Canada %messagerie électronique-%Canada %TdT-%Canada %communications-%Canada

LISTE DES DESCRIPTEURS
et des combinaisons de descripteurs

Les combinaisons de descripteurs sont formées soit par le trait d'union (ex. *%TA-%Japon*, pour «traduction automatique (au) Japon», soit par les symboles < et <> qui signifient respectivement «traduction vers (telle langue)» et «traduction vers (telle langue) et vice versa». Ainsi la combinaison *%TA-%anglais>%français* se rend par «traduction automatique de l'anglais au français», tandis que *%TA-%anglais<>%français* indique qu'il s'agit de «traduction automatique de l'anglais au français et vice versa». Seules les combinaisons autorisées par la liste ci-après seront repérées par le logiciel.

* * *

%A
administration (domaine de traduction)
aérospatial (domaine de traduction)
agriculture (domaine de traduction)
allemand >anglais <>anglais >chinois >espagnol <>espagnol >français
<>italien<>japonais<>espagnol
Amérique latine
anglais >allemand <>allemand<>français<>italien<>japonais<>espagnol
>arabe >chinois >danois <>danois >espagnol <>espagnol
<>esperanto<>français >français <>français
<>français<>allemand<>espagnol >hongrois >italien <>italien >japonais
<>japonais >néerlandais <>néerlandais >portugais <>suédois
arabe
auto-apprentissage
automobile (domaine de traduction)
aymara

%B
banque de terminologie -anglais<>français -Canada -Europe occidentale
-Europe orientale -forces armées -français -allemand -multilingue
-publique -Québec -russe
base de données bitextuelles -Europe occidentale -multilingue
bas prix (c.-à-d. qui se vend à moins de 1 000 $)
braille -néerlandais<>anglais

%C
Canada *voir aussi* Québec
chinois <>japonais
commerce (domaine de traduction)
communications (domaine de traduction) -Canada
comparateur de versions -anglais -français
compte-mots -USA
concepts *voir* représentation des concepts
concordancier -Europe occidentale -grec -USA
conjugueur (de verbes) -français
connaissance (système fondé sur la ...) -Canada -Europe occidentale
-français>allemand -néerlandais<>anglais -USA
correcteur grammatical -anglais -USA
correcteur orthographique -anglais -ergonomie -français -Québec -USA

correcteur stylistique -anglais -USA
coût de développement
cyrillique (alphabet)

%D
danois >allemand
dictionnaires -allemand -anglais -anglais<>japonais -commerce
-disque optique -électronique -Europe occidentale -Europe orientale
-finances -français -Japon -micro -multilingue -espagnol -russe
disque optique -Canada
documentation, services de (domaine de traduction)
doublage (cinématographique) -Royaume-Uni

%E
électronique (domaine de traduction)
ergonomie
espagnol >anglais
<>anglais<>français<>allemand<>italien<>japonais<>espagnol <>français
<>hongrois <>néerlandais <>suédois
esperanto >allemand >chinois
Eurotra
Europe occidentale, *voir aussi* Royaume-Uni
Europe orientale
évaluation -méthodologie statistique
Extrême-Orient

%F
forces armées (domaine de traduction)
français >allemand <>allemand <>allemand<>italien<>japonais<>espagnol
<>allemand<>espagnol >chinois >espagnol <>espagnol >italien
>néerlandais

%G
génération de texte bilingue -anglais<>français -Canada -interlingua
-météorologie -micro -Prolog -sous-langage
grammaire des cas
grec
gros ordinateur (système conçu pour ...)

%H
hongrois

%I
IA (= intelligence artificielle, *voir aussi* Connaissance) -Canada
indonésien <>japonais
industries *voir aussi* aérospatial, automobile, textile
intégré (à la production de documentation multilingue)
interactif -Europe occidentale
interlinéaire (traduction)
interlingua -esperanto (*voir aussi* Intermediate)
interprète *voir* parole
italien -anglais<>français<>allemand<>italien<>japonais<>espagnol

%J
japonais >allemand >anglais
<>anglais<>français<>allemand<>italien<>japonais<>espagnol >koréen
<>malaisien <>thaïlandais
Japon

%K
koréen

%L
langage restreint (à l'entrée au système de TA) -Europe occidentale
-Royaume-Uni
lexicographie *voir* dictionnaires
LISP (langage de programmation)

%M
malaisien
manuels (traduction de ...)
messagerie électronique -Canada
météorologie (domaine de traduction)
méthodologie statistique
microcomputer based
mini (= système conçu pour mini-ordinateur)
morphologie
Moyen-Orient
multilingue

%N
néerlandais <>anglais >allemand <>espagnol
non-traducteurs (système conçu pour ...)
norvégien

%O
ontologie *voir* connaissance
organismes internationaux (utilisateurs)

%P
parole (reconnaissance et sythèse de la ...) -allemand<>anglais
-anglais>français -anglais>allemand -anglais>italien -anglais<>italien
-anglais>italien -anglais<>espagnol -anglais<>suédois -Canada -commerce
-IA -japonais -Japon -poche -portatif -Royaume-Uni -USA
pivot (transfert par ...) -aymara
poche (système conçu pour ordinateur de ...) -Europe occidentale
-anglais<>français<>allemand<>italien<>japonais<>espagnol
portugais
portatif
postédition -USA
préédition -interactif
productivité -Europe occidentale -organismes internationaux
Prolog (langage de programmation) -Canada
PTT (= poste de travail du traducteur) -français -Europe occidentale
-multilingue
publique (accessible au ...) -Canada -Europe occidentale

%Q
qualité (de la traduction)
Québec

%R
recherches -Amérique latine -Canada -Europe occidentale
(*voir aussi* Eurotra) -Europe orientale -Japon -parole -Royaume-Uni
reconnaissance de caractères -braille -néerlandais -anglais -Europe
occidentale -français -allemand -italien -japonais -manuscrit
-norvégien -suédois -USA

rédacteurs *voir* non traducteurs
renseignements (sécurité) (domaine de traduction)
représentation des concepts
Royaume-Uni
russe >chinois >anglais >français >allemand - *voir aussi* cyrillique

%S
santé (services de ..., domaine de traduction)
scientifique et technique (genre de traduction)
sémantique (la ...)
SIG (= système d'information à la gestion) -Canada
sous-langage -allemand -industries
synonymes -anglais -français *voir aussi* thésaurus
suédois

%T
TA (= traduction automatique) -administration -aérospatial -allemand>anglais -allemand>chinois -allemand>espagnol -allemand<>espagnol -allemand>français -allemand>russe -Amérique latine -anglais>allemand -anglais<>allemand -anglais>arabe -anglais>chinois -anglais>danois -anglais<>danois -anglais<>espagnol -anglais<>esperanto<>français -anglais>français -anglais<>français -anglais<>français<>allemand<>espagnol -anglais>hongrois -anglais>italien -anglais>japonais -anglais<>japonais -anglais>néerlandais -anglais>portugais -anglais>russe -anglais<>russe -anglais<>suédois -anglais>tchèque -aérospatial -auto-apprentissage -automobile -bas prix -Canada -chinois<>japonais -coût de développement -danois>allemand -dictionnaires -documentation -ergonomie -esperanto>chinois -espagnol>allemand -espagnol>anglais -espagnol<>français -espagnol<>hongrois -espagnol<>néerlandais -espagnol>russe -espagnol<>suédois -Europe occidentale (*voir aussi* Eurotra) -Europe orientale -évaluation -Extrême-Orient -forces armées -français -français>chinois -français>néerlandais -français>allemand -français<>allemand français>italien -français<>espagnol -français>russe -grammaire des cas -gros ordinateur -IA -indonésien<>japonais -intégré -interactif -interlingua -japonais -japonais>allemand -japonais>anglais -japonais>koréen -japonais<>malaisien -japonais<>thaïlandais -Japon -langage restreint -LISP -malaisien -manuels -météorologie -micro -mini -morphologie -Moyen-Orient -multilingue -néerlandais<>anglais -néerlandais<>français -néerlandais>allemand -néerlandais<>espagnol -non-traducteurs -organismes internationaux -pivot -portugais -postédition -préédition -productivité -PTT -publique -qualité -reconnaissance de caractères -renseignements -représentation des concepts -Royaume-Uni -russe>chinois -russe>anglais -russe>français -russe>allemand -scientifique et technique -sous-langage -TdT -terminologie -textile -thaïlandais -traitement des données -transfert direct -USA
TAO (= traduction assistée par ordinateur) -anglais -anglais>français -anglais<>français -anglais>allemand -anglais<>allemand -anglais>italien -anglais>espagnol -Canada -Europe occidentale -japonais -manuels -micro -mini -multilingue -non-traducteurs -Royaume-Uni -traitement des données -USA
tchèque
TdT (= traitement de texte) -anglais -Canada -Europe occidentale -français -interlinéaire -multilingue -Québec -USA
terminologie (et fichiers terminologiques) -allemand -allemand>anglais -anglais -bilingue -Canada -cyrillique -danois -disque optique -Europe occidentale -espagnol -français -grec -italien -micro -mini -multilingue

-néerlandais -portugais -productivité -suédois -traitement des données -turc -USA. ***Voir aussi*** Banque de terminologie

textes (gestion et dépistage de ...) -allemand -anglais>français -Canada -Québec, ***voir aussi*** base de données bitextuelles

textile

thaïlandais

thésaurus -anglais -français

traitement des données (domaine de traduction)

traitement différé

transcodage -japonais>anglais

transfert direct (entre structures de surface) ***voir aussi*** transcodage

turc

%U

URSS ***voir*** Europe orientale

USA (= États-Unis)

%V

vérificateur ***voir*** correcteur

II. RÉPERTOIRE DES SOCIÉTÉS ET DES INSTITUTIONS productrices de systèmes de TA et de TAO

* * *

Note: Le symbole -> renvoie au Répertoire de logiciels

* * *

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**AD LIB
***Coordonnées électroniques:* tél. (418) 529-9676, (800) 463-2686
***Adresse postale:* 200, Grande Allée est, Bureau 850, Québec (Québec) G1R 2J1, Canada
***Importance:* PME
***Domaine:* Fabricant de logiciels
***Système:* Le Conjugueur ->

**ALIF (Institut Alif)
***Coordonnées électroniques:* tél. 33-1-48326108
***Adresse postale:* 54, ave Henri-Barbusse, 93700 Drancy, France
***Direction:* Cheikh Khaled A Bentounes (président), Rachid Kechidi (directeur)
***Importance:* PME, importante dans le monde arabe
***Secteur:* privé
***Domaines:* banques de données et logiciels pour le monde islamique
***Système:* El-Furqân (La Banque universelle des données islamiques), El-Farîd (TdT arabe) ->
***Publications:* «Alif Info» bulletin

**ADVANCED PRODUCTS AND TECHNOLOGIES
***Adresse postale:* Redmond WA, USA
***Importance:* PME
***Secteur:* industrie privée
***Domaine:* cinéma
***Système:* Dubbed The Voice ->

**ALL-UNION CENTRE FOR SCIENTIFIC & TECHNICAL TRANSLATIONS (Vsyesoyuzî Tsentr Pyeryevodov Nauchno-tekhnichyeskoi lyteraturi y Dokumentatsyy / VCP)
***Coordonnées électroniques:* tél. Moscou 1247024
***Adresse postale:* Krzhizhanovskogo 14, block 1, Moscow 117218, URSS
***Importance:* le plus important bureau de traduction technique en URSS
***Secteur:* État
***Domaine:* traduction scientifique et technique
***Direction:* Dr.I. Oubine
***Système:* AMPAR, ANRAP, ARAP, NEPRA, SPRINT, Automated Lexicographic System, Computer Dictionary ->

**ASIACOM
***Adresse:* Victoria C.-B., Canada
***Importance:* PME
***Secteur:* privé
***Domaine:* traitement de texte chinois
***Système:* TIANMA II

**ASSOCIATION FOR COMPUTATIONAL LINGUISTICS (ACL)
Coordonnées électroniques: tél. (201)829-4312. E-mail: bellcore!walker@berkeley.arpa, walker@mouton.arpa, walker%mouton@csnet-relay
Adresse postale: c/o Dr. D. E. Walker, Bell Communications Research, Bellcore MRE 2A379, 445 South Street, Morristown NJ 07960-1961, USA
Direction: Ralph M. Weischedel (président), Dr. Donald E. Walker (secrétaire-trésorier)
Importance: La plus importante association d'informaticiens linguistiques
Secteur: recherches
Domaines: informatique linguistique, TA
Publications: "Computational Linguistics" (revue scientifique), "Studies in Natural Language Processing" (collection)

**ATTILA JOSZEF UNIVERSITY OF SZEGED (JATE)
Adresse postale: Egyetem u. 2, Szeged, H-6722 Hongrie
Importance: faible
Secteur: recherches
Domaine: TA
Système: SZEHAT ->

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**BEHAVIOR TECHNOLOGY COMPUTER CORPORATION, BTC R&D Center
Coordonnées électroniques: tél. 886-35-770-243, fax 886-35-770-459
Adresse postale: No 28, R&D Road 11, Science-Based Industry Park, Hsin-Chu, Taiwan
Importance: PME
Secteur: industrie privée
Direction, domaine, système: voir National Tsing Hua University

**BLUMEN (Etablissements Blumen)
Coordonnées électroniques: tél. (514) 628-0472
Adresse postale: 135, rue Filion, Laval (Québec) H7L 2V9, Canada
Responsable: Jean-Guy Grenier
Importance: PME
Secteur: privé
Système: Le Terminologue ->

**BRAVICE *ou* BRAVIS INTERNATIONAL Inc.
Adresse postale: Sumitomo-Ichigaya Bldg., 1-1, Motomura-cho, Ichigaya, Shinjuku-ku, Tokyo 162, Japan
Direction: Takehito Yamamoto
Importance: le premier fabricant au Japon à lancer un système de TA anglais-japonais sur le marché, il a acheté les droits de Weidener en 1984
Secteur: privé
Domaine: TA
Systèmes: Micro-Pack J/E II, Mini-Pack, Toolkit ->

**BRITISH TELCOM Research Laboratories
Adresse postale: Royaume-Uni
Importance: multinationale
Secteur: recherches
Domaine: reconnaissance de la parole et traduction orale
Système: Telephone Interpreter ->

**BURO VOOR SYSTEEMONTWIKKELING «BSO», BSO/Research
Coordonnées électroniques: tél. 31-30-911911, telex 40342, E-mail gen@dlt1.uucp
Adresse postale: Kon. Wilhelminalaan 3 / Postbus 8348, NL-3503 RH Utrecht, Netherlands
Direction: Klaus Schubert
Importance: grande société de logiciel
Secteur: recherches
Domaine: TA
Système: DLT ->

**BYTETOWN CONSULTING (filiale de H. Burgers & Associates)
Coordonnées électroniques: tél. (613) 733-5970, fax 737-7704
Adresse postale: 2660 Southvale, suite 301A, Gloucester Ont. K1B 4W5, Canada
Direction: H. Burgers
Importance: PME
Secteur: privé
Domaine: dépositaire de logiciels de traductique
Système: MTX, Rosetta, TextSearch, WordCruncher ->

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**CAMELOT-INFO
Coordonnées électroniques: tél. (514) 861-5019
Adresse postale: 1191, carré Phillips, Montréal, H3B 3C9, Canada
Importance: PME
Secteur: privé
Domaine: dépositaire de logiciels de traductique
Système: WordFinder, Conjugons, Orthograf Plus ->

**CARNEGIE MELLON UNIVERSITY «CMU», School of Computer Science, Center for Machine Translation «CMT»
Coordonnées électroniques: tél. (412) 268-6591, fax 268-6298
Adresse postale: Smith Hall, Forbes Ave, Pittsburgh PA 15213-3890, USA
Direction Jaime Carbonell (Director), Masaru Tomita (Associate Director), Sergei Nirenberg (operational head)
Publications: "Machine Translation" (revue scientifique)
Système: KBMT ->

**CENTRE CANADIEN DE RECHERCHE SUR L'INFORMATISATION DU TRAVAIL «CCRIT» / CANADIAN WORKPLACE AUTOMATION RESEARCH CENTRE «CWARC» (Communications Canada), Groupe de traduction assistée
Coordonnées électroniques: tél. (514) 682-3400
Adresse postale: 1575, bd Chomedy, Laval (Québec) H7V 2X2, Canada
Importance: moyenne, grâce en particulier aux liens avec le Secretariat d'Etat
Responsable: Pierre Isabelle
Secteur: recherches (TA) et développement (PTT), Etat
Domaine: (1) TA, (2) poste de travail du traducteur
Système: CRITTER, PTT ->

**CENTRE FOR INTERNATIONAL COOPERATION FOR COMPUTERISATION «CICC»
Pays: Japon
Secteur: recherches internationales
Domaine: TA
Importance: considérable dans le cadre de la politique industrielle de

coopération internationale
Systèmes: ODA ->

**CHINA SOFTWARE TECHNIQUE CORPORATION «CEC», Language Engineering Laboratory «LEL»
Pays: Chine
Directions: Pr. Dong Zhen Dong
Importances: moyenne
Secteurs: semi-privé (commandité par le Ministry of Machine Building and Electronic Industries)
Domaines: TA
Systèmes: Transtar ->

**CHINESE ACADEMY OF SOCIAL SCIENCES, Institute of Linguistics, Computational Linguistics Division
Adresse postale: 5 Jianguomennei Dajie, Beijing 100732, China
Chercheurs: Pr. Li Wei
Importances: moyenne
Secteurs: recherches
Domaines: TA
Systèmes: JFT, JFY-IV ->

**COGENTEX
Coordonnées électroniques: tél. et fax (514)737-4367, Bitnet kittredg@iro.umontreal.ca
Adresse postale: c/o Dr. Richard Kittredge, Département de linguistique et philologie, Université de Montréal
Directions: R. Kittredge
Importances: petit mais fort en personnel de recherche et très innovateur
Secteurs: R&D
Domaines: TA
Systèmes: FoG ->

**CLC ltée (Filiale de Lexitech, USA)
Coordonnées électroniques: tél. (819)777-5779, fax 777-0239
Adresse postale: 207, bd Mont-Bleu, bureau 214, Hull (Québec) J8Z 3G3, Canada
Directions: Jacques Tallefer
Importances: PME
Secteurs: privé
Domaines: traduction à contrat; TA
Systèmes: Le Routier ->

**Université de COPENHAGUE
Coordonnées électroniques: tél. 45-1-542211
Adresse postale: Njalsgade 80, DK-2300 Kbh S, Denmark
Directions: Bente Maegaard
Importances: maillon de la chaîne EUROTRA
Secteurs: recherches universitaires
Domaines: TA
Systèmes: EUROTRA-DK ->

**CSK
Adresse postale: Japan
Secteurs: privé
Domaines: TA

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**EDIT inc.
Adresse postale: Bureau 1005, 1253 ave McGill College, Montréal (Québec) H3B 2Y5, Canada
Importance: PME
Secteur: privé
Domaines: TA et TAO
Systèmes: vendeur des systémes de JOHN CHANDIOUX

**ELVECO
Coordonnées électroniques: tél. 33-161-64462527, fax 64463860, telex 600-604 elveco
Adresse postale: 69, rue de Paris, F-91400 Orsay, France
Système: Dépositaire européen de HEXAGLOT T1500 ->

**University of ESSEX, Department of Language & Linguistics
Coordonnées électroniques: tél. 44-206-872082, 873333, telex 98440 UNILIB, télégrammes: University Colchester
Adresse postale: Wivenhoe Prk, Colchester CO4 3SQ, UK
Direction: Doug Arnold
Importance: maillon de la chaîne EUROTRA
Secteur: recherches universitaires
Domaine: TA
Système: EUROTRA ->

Commission of the EUROPEAN ECONOMIC COMMUNITIES «EEC» / COMMISSION DES COMMUNAUTéS EUROPéENNES «CEE», Directorate-General XIII (Telecommunications and Information) «DG XIII» and Directorate-General IX (Personnel, including Translation) «DG IX», Eurotra Project
Direction: Sergei Perschke
Importance: "Currently the largest single machine translation project in the world in terms of number of personnel, and possibly in terms of expenditure." [Kingscott, "Applications..." p.39]
Secteur: publique et universitaire
Domaine: TA
Système: EUROTRA ->

---- Japan-Info Project
Domaine: documentations scientifique et technique
Système: ATLAS II ->

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**FINALSOFT
Coordonnées électroniques: tél. (800) 232-8228
Adresse: USA
Direction: Sergio Ferragut, président
Importance: PME
Secteur: privé
Domaine: fabricant de logiciel
Système: TRANSLATE ->

**FUJITSU
Adresse: Namazu, Japon
Importance: géant de l'industrie japonaise
"If Bravice is disregarded, the market leader in terms of sales and

sophistication [of MT systems in Japan] is probably Fujitsu... Sales are now over a hundred." [Kingscott, "Applications..." p.34]
Secteur: industrie privée
Domaines: électronique; TA
Systèmes: ATLAS I, ATLAS II ->

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**GACHOT S.A.
Fondation: 1946
Coordonnées électroniques: tél. 33-39-399011
Adresse postale: 26bis, ave de Paris, 95230 Soisy-sous-Montmorency, France
Direction: Jean Gachot, p-d-g
Importance: multinationale de la TA grâce à son achat des droits de Systran pour tous les pays sauf le Japon - voir aussi SYSTRAN TRANSLATION SYSTEMS
Secteur: privé
Domaine: TA
Systèmes: SYSTRAN, EXPRESS TRADUCTION par MINITEL ->

**GA INVESTMENTS
Direction: Nevil Garrett, Robert Adams (anciens de Weidner)
Importance: actionnaire de International Translation Corp
Secteur: privé
Domaine: CAT
Systèmes: détient les drois de MICROCAT et MACROCAT -> pour le Canada et l'Amérique latine

**GAMMA PRODUCTIONS, Inc.
Coordonnées électroniques: tél. (213) 394-8622
Adresse postale: 710 Wilshire Blvd, Sta Monica, CA 90401, USA
Importance: PME
Secteur: privé
Domaine: logiciel de traitement de texte multilingue
Systèmes: Multi-Lingual Scribe, Multi-Lingual Scholar

**GARSEN CARCY ENTERPRISES, Inc.
Coordonnées électroniques: tél. (613) 521-3331, telex 053-4741 Superior ORL
Adresse postale: 1990 Leslie Ave, Ottawa K1H 5M3, Canada
Direction: Tin S Yap, président
Importance: PME
Secteur: privé
Domaine: importation
Système: SINOLOGIST Chinese electronic typewriter

**GLOBAL COMPUTER CENTER
Coordonnées électroniques: tél. (313) 581-1140
Adresse postale: 14212 Michigan Av, Dearborn, MI 48126, USA
Importance: PME
Secteur: privé
Domaine: logiciel
Système: Al-Kortass, système de traitement de texte arabe

**GLOBALINK LANGUAGE SERVICES
Coordonnées électroniques: tél. (703) 281-5612, (800) 446-4462, fax 703/281-4541, telex 6501146095 MCI
Adresse postale: 2911 Hunter Mill Rd #201, Oakton, VA 22124, USA
Importance: bureau de traduction important

Secteurs privé
Domaines traduction de tout genre; TA
Systèmes GTS ->

**GROUPE D'ÉTUDE POUR LA TRADUCTION AUTOMATIQUE «GETA» de l'Université Joseph Fourier (GRENOBLE 1) «UJF», du Conseil National de la Recherche Scientifique «USMG-CNRS»» et de l'Institut IMAG
Fondation vers 1960
Coordonnées électroniques tél. 76514600 postes 5263/4/5/6, 76514817, fax 76514848, telex 980-134F
Directions Christian Boitet
Importance parmi les plus prestigieux centres de la recherche en matière de TA, son influence s'est fait sentir dans plusieurs pays étrangers, dont le Canada
Adresse postale IMAG-campus, 150, rue de la Chimie, St Martin d'Hères / BP 53X, F-38041 Grenoble Cedex, France
Secteurs recherches universitaires
Domaines TA
Systèmes ARIANE-85, ATEF, PROTRA, CALLIOPE, LIDIA ->

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**HITACHI CORPORATION LTD, Advanced Research Laboratory
Coordonnées électroniques tél. 423-23-1111, fax 423-26-0880
Adresse postale Kokobunji, Tokyo 185, Japon
Directions Yoshihiko Nitta
Importance géant de l'industrie japonaise de l'électronique
Secteurs industrie privée
Domaines électronique; TA
Systèmes HICATS

---- Systems Development Laboratory
Adresse postale 1099 Ohzenji, Asao-ku, Kawasaki-shi 215, Japon
Directions Hiroyuki Kaji
Domaines recherche en TA

**Datentechnik HORST GABRIEL
Coordonnées électroniques tél. 7131-52098
Adresse postale Zügelstrasse 26, 7100 Heilbronn, RFA
Directions Horst Gabriel
Importance PME
Secteurs privé
Domaines logiciels
Systèmes PROFILEX ->

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**IBERSOFT, Inc.
Coordonnées électroniques tél. 609-890-1469, telex 6502635518
Adresse postale POB 3455, Trenton, NJ 08618, USA
Importance PME
Secteurs privé
Domaines logiciels
Systèmes Escribien ->

**INK INTERNATIONAL
Coordonées électroniques: tél. 31-20-646361, fax 629064, telex 18298 ink nl
Adresse postale: Prins Hendriklaan 523, 1075 BE / POB 5477, 1007 AL Amsterdam, Netherlands. Succursales à Paris, Madrid, Oslo, Lisbonne, Stockholm et Stuttgart
Importance: multinationale de la traduction
Secteur: privé
Domaine: traductions de tout genre; CAT
Système: TEXTOOLS, MORFIX, TERMTRACER ->

**INSTITUT DALLE MOLLE POUR LES ETUDES SEMANTIQUES ET GOGNITIVES «ISSCO»
Coordonnées électroniques: tél. 41-22-705-7114
Adresse postale: 54, Route des Acacias, CH-1227 Genève, Suisse
Importance: un maillon de la chaîne EUROTRA
Direction: Margaret King
Secteur: recherches universitaires
Domaine: TA, lexicographie

**INSTITUT DU TEXTILE DE FRANCE
Adresse: France
Importance: un pionnier de la TA souvent cité en exemple
Secteur: publique
Domaine: documentation scientifique et technique
Système: TITUS ->

**INTERGRAPH
Système: MicroCAT ->

**INTERNATIONAL BUSINESS MACHINES, Inc. «IBM», European Language Services «ELS»
Adresse: BikerØd, près de Copenhague, Danemark
Direction: Henning BØrgesen
Importance: chapeaute 18 services de traduction travaillant dans 16 langues
Secteur: industrie privée
Domaine: informatique; TAO
Système: LMT, TSF ->

---- Thomas J. Watson Research Center
Adresse: Yorktown Heights, NY, USA
Importance: Le principal centre de recherche d'IBM
Secteur: recherches
Domaine: TAO et TA
Système: CRITIQUE ->, méthode statistique de TA

----- IBM Japan Ltd, IBM Research, Tokyo Research Laboratory, Natural Language Processing Group
Adresse postale: 5-19, Sanban-cho, Chiyoda-ku, Tokyo 102, Japon
Secteur: industrie privée
Système: SHALT ->

**INTERNATIONAL COMMITTEE ON COMPUTATIONAL LINGUISTICS «ICCL»
Fondation: vers 1962
Coordonnées électroniques: tél. (415) 323-5925
Direction: Martin Kay, président
Importance: parraine les biennales de l'informatique linguistique «COLING»
Secteurs: recherches
Domaine: informatique linguistique et TA

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**JAPAN INFORMATION CENTRE FOR SCIENCE AND TECHNOLOGY «JICST», MT Project
Importance: la bibliothèque scientifique nationale du Japon
Secteur: publique
Domaine: documentation scientifique et technique; TA
Système: MU-2 ->

**JAPAN TELEPHONE COMPANY
Importance: la «Bell Canada» du Japon
Secteur: industrie privée
Domaine: télécommunications; TA de la parole
Système: ATR ->

**JOHN CHANDIOUX experts-conseils inc. = John Chandioux Consultants, Inc.
Coordonnées électroniques: tél. (514) 871-0053, fax 871-1269, telex 055-60344
Adresse postale: 30bis, rue Ste-Anne, Ste-Anne-de-Bellevue (Québec) H9X 1L3, Canada
Direction: John Chandioux, président
Importance: PME avec beaucoup d'expérience canadienne
Secteur: privé
Domaine: TA et TAO
Système: Gram-R(MD), METEO2, GÉNÉRAL TAO ->

=K

**Univerzity KARLOVY (= Université Charles), Matematicko-Fyzikální Fakulta, Katedra Aplikované Matematiky «MFF UK-Linguistics»
Coordonnées électroniques: tél. 42-2-53-21-36
Adresse postale: Malostranské nám. 25, 118 00 Praha 1, Tchechoslovakie
Direction: Pr. Peter Sgall, Dr Eva Hajicová
Importance: renommé pour ses recherches en linguistique théorique
Secteur: recherches universitaires
Domaine: informatique linguistique, TA
Système: APAC ->
Publication: "Prague Journal of Mathematical Linguistics"

**KURZWEIL APPLIED INTELLIGENCE
Adresse: USA
Importance: importante fabricant de matériel électronique d'application linguistique
Secteur: industrie privée
Domaine: reconnaissance de caractères «OCR»
Système: Series 4000, Discover -> 11-19-90

**KVAL RESEARCH INSTITUTE FOR INFORMATION SCIENCE
Coordonnées électroniques: tél. 46-8-789-6683, fax 796-9639, telex 15440 kval s
Adresse postale: Skeppsbron 26, S111-30 / POB 15055, S104-65, Stockholm, Sweden
Direction: Hans Karlgren
Importance: PME
Secteur: privé
Domaine: informatique linguistique, TAO

**KYOTO UNIVERSITY, Department of Electrical Engineering
Coordonnées électroniques: tél. 75-751-2111 poste 5344, fax 75-751-15761, telex 542245 DEEKYU
Adresse postale: Yoshida, Sakyo, Kyoto 606, Japon
Direction: Pr. Makoto Nagao
Importance: pionniers de la TA au Japon
Secteur: recherches universitaires
Domaine: TA
Système: Mu ->

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**Katholieke Universiteit LEUVEN
Adresse: Leuven, Belgique
Importance: maillon de la chaîne EUROTRA
Secteur: recherches universitaires
Domaine: TA
Système: EUROTRA, METAL ->

**LEXI-TECH (Lexi-tech) Inc. (filiale de Saint John Shipbuilding & Drydock Ltd, une société de la famille Irving)
Coordonnées électroniques: tél. (506) 859-5200
Adresse postale: Édifice Marvin's, Boîte 11, 1 Factory Lane, Moncton N.-B., Canada
Direction: Ronald Fournier, p-d-g
Importance:
"A new translation company has been specially created to process what could well be the largest translation contract in the world, to translate documentation for a major Canadian defence order for new frigates from English to French." ["LI" 1:4.15]
Secteur: industries de la défence
Domaine: traduction technique; TAO
Système: LOGOS, KURZWEIL, TOVNA (?) ->, Ann-Tech graphic digitizers, Interleaf desktop publishing

**LINGUATECH INTERNATIONAL, Inc.
Coordonnées électroniques: tél. (801) 373-8800, telex (via WUI) 6502667250 MCI UW, MCI mail: LINGUATECH
Adresse postale: 381 W 2230 N #360, Provo, UT 84604, USA
Direction: Alan Melby
Importance: PME, pionnier dans son domaine
Secteur: privé
Domaine: logiciels de gestion de terminologie / terminology file managers
Système: MTX ->

**LINGUISTIC PRODUCTS (tm)
Coordonnées électroniques: tél. (713) 363-9154, fax 298-1911
Adresse postale: POB 8263, The Woodlands, TX 77387, USA
Direction: Ralph Dessau
Importance: PME
Secteur: privé
Domaine: TA
Système: PC-TRANSLATOR ->

**LOGIDISQUE
Coordonnées électroniques: (514) 933-2225
Adresse postale: CP 10, Succ. D, Montréal (Québec) H3K 3B9, Canada

Importance: PME
Secteur: privé
Domaine: bureautique en français
Système: «bureautique ouverte» composée de HUGO, LE GRAMMARIEN, L'ECRIVAIN PUBLIQUE ->

**LOGOS Corp.
Fondation: 1969
Coordonnées électroniques: tél. (617) 237-5500, telex 951179
Adresse postale: 20 William St, Wellesley, MA 02181, USA
Direction: Bernard E (Bud) Scott (président), Chas O. Staples (CEO)
Importance: un des plus importants fabricants de logiciel de TA et TAO
Secteur: privé, multinational
Domaine: TA, TAO
Système: LOGOS ->

---- Computer Systems Deutschland GmbH
Coordonnées électroniques: tél. 69-6666950, telex 4-189-808 logo d
Adresse postale: Lyoner Str 11, 6000 Frankfurt/Main 71, RFA

---- Logos Canada Ltd / ltée
Fondation: 1986
Coordonnées électroniques: tél. (514) 843-7822, telex 0524371
Adresse postale: Le Cours St-Pierre, 105 Normand, Montreal H2Y 2K6
Direction: H. Harro Hassel, vice-président

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**Universiti Sains MALAYSIA, PPS Matematik & Sains Komputer / Department of Mathematics & Computer Science
Coordonnées électroniques: tél. 60-4-877888 postes 3925 et 3646, fax 60-4-871526, telex 40254 MA
Adresse postale: 11800 USM Penang, Malaysia
Direction: Dr. Chan, Zaharin Yusoff
Importance: locale
Secteur: recherches universitaires
Domaine: TA
Système: ARIANE ->

**University of MANCHESTER INSTITUTE OF SCIENCE & TECHNOLOGY <UMIST>, Department of Language & Literature, Centre for Computational Linguistics <CCL/UMIST>
Coordonnées électroniques: 61-2363311
Adresse postale: POB 88, Manchester M60 1QD, UK
Direction: Pr. Juan C Sager
Importance: un des plus importants centres universitaires de TAO et de TA, parmi les rares à offrir un diplôme dans cette discipline, et un maillon de la chaîne Eurotra
Secteur: recherche et instruction universitaires
Domaine: TA, TAO, terminologie
Système: British Term Bank, N-Tran (anglais-japonais)

**MATSUSHITA ELECTRIC
Adresse: Japon
Importance: géant de l'industrie japonaise de l'électronique
Secteur: industrie privé
Domaine: TA

**MICROELECTRONICS AND COMPUTER TECHNOLOGY CORP <MCC>, Human Interface Laboratory
Adresse: Austin TX, USA
Direction: Jonathan Slocum
Importance: PME dotée d'un directeur qui est renommé pour son travail avec l'équipe de METAL
Secteur: privé
Domaine: logiciel linguistique
Système: NABU (lexicographie et terminographie multilingues)

**MICROTAC SOFTWARE
Coordonnées électroniques: (619) 272-5700, fax 9734
Adresse postale: 4655 Class Street, Suite 214, San Diego CA 92109-9827, USA
Importance: PME
Secteur: privé
Domaine: fabricant de logiciels; TAO
Système: Spanish Assistant->, French Assistant, German Assistant, Italian Assistant

**MINISTRY OF INTERNATIONAL TRADE & INDUSTRY <MITI>
Adresse: Tokyo, Japon
Direction: Hajime Tamura, ministre (1987)
Importance: je principal bailleur de fonds de la recherche et développement japonais en matière de TA
Secteur: Etat
Domaine: TA au niveaux national et international
Système: entre autres, le projet KANTA en Malaisie

**MITSUBISHI ELECTRIC
Adresse: Japon
Importance: géant de l'industrie japonaise de l'électronique
Secteur: industrie privé
Domaine: TA
Système: MELTRAN ->

=N

**NATIONAL TSING-HUA UNIVERSITY, Department of Electrical Engineering; 35/715131; Hsin-Chu, Taiwan; Assoc Prof Dr Keh-Yih Su 35/712560 sa BEHAVIOR TECHNICAL COMPUTER CORP; Système: ArchTran ->

**NEC; Japan; Système: PIVOT ->

**NEW MEXICO STATE UNIV; Las Cruces NM 88001 ; Yorick Wilks; Système: LUTE ontology

**NEXYS: 514/844-1198, fax 383-7230; Montréal; Dépositaire de GTS, Superlex, Aquila, Phenix, CompareRite, DocuComp, Le Robert électronique, OED, Languages of the World ->; Kurzweil scanners, NEC & Toshiba CD-ROM readers

**NORLUS. Inc.; 204/284-1217. Fax 474-1256; 1150C Waverley St, Winnipeg R3T 0P4; Pres & Chief Research Officer: Douglas A Young (U of Manitoba); Système: Nonverbal Reasoning & Language Understanding System <NORLUS>

**NORTH CHINA INSTITUTE OF COMPUTING TECHNOLOGY; 2017661-69. Telex 222630 NCI CN. Fax 2018902. Cables: 2422 Beijing; POB 619-69, Beijing, China; Part-time Senior Engineer: Yu Da-Yong (Associate Prof at Institute of

Software, Academia Sinica)

=O

**OKI ELECTRIC: Japan: Système: PENSEE ->

**ORDA-B: Belgique: Système: SYSTRAN ->

**University of OSAKA PREFECTURE, Faculty of Engineering, Dept of Electrical Engineering: Mozu-Umemachi, Sakai, Osaka, Japan 591: Fujio Nishida, Shinobu Takamatsu: Système: PEKUS ->

**University of OTTAWA, Computer Science Dept, AI Laboratory = Laboratoire d'intelligence artificelle, CODE project: (613) 564-5418: Ottawa K1N 6N5, Canada: Principal Investigator: Douglas Skuce: Funder: BNR: Système: CODE ->

=P

**PALANTIR SOFTWARE: (713)) 955-8787: 12777 Jone rd #100, Houston, TX 77070, USA

**PAN-AMERICAN HEALTH ORGANIZATION <PAHO>: Washington DC: Staff: Muriel Vasconcellos sa \MT.BIB: Systèmes: SPANAM, ENGSPAN ->

**PANCOM TECHNICAL COMMUNICATORS Inc: Capitol Square, 65 East State Street, Suite 1000, Columbus, OH 43215, USA: Système: WORDCOUNT ->

**PEDAGOGICAL INSTITUTE: Leningrad, USSR: Système: SILOD ->

**PELADA INFORMATICA Inc: 727-5194. Source: STP892: 179 Colonnade Rd, Nepean K2E 7J4: Sales Dir: Brian Elliott: Système: COMMUNIQUÉ (traitement de texte français, espagnol, grec

**PERKINS ENGINES: UK: Head of Technical Publications: Peter Pym: Systèmes: MacroCAT ->, Perkins Approved Clear English <PACE>

**PHILIPS n.v.: Eindhoven, Netherlands: Systèmes: ROSETTA, ROSETTA3, ROSETTA4 ->

=Q

**Université du QUÉBEC A MONTRÉAL <UQAM>, Centre d'ATO: Montréal, Canada: Système: TERMINO ->

=R

**Le ROBERT: Paris, France: Système: Le ROBERT ÉLECTRONIQUE ->

**RICOH: Japon: Système: RMT ->

**RIGHTSOFT: 813/923-0233: Sarasota FL, USA: Système: RightWriter ->

=S

**Universität des SAARLANDES, Sonderforschungsbereich Elektronische Sprachforschung; c1970; Saarbrücken, RFA; Wolfram Wilss, Heinz-Dirk Luckhardt, Felix Mayer; Systèmes: ASCOF, SUSY ->

**SANYO ELECTRIC; Japan; Système: SWP-7800 ->

**SHEFFIELD UNIVERSITY; Sheffield, UK; Système: AIDTRANS ->

**SIEMENS AG; 89/636-82154, fax 82242; (1) Hofmannstrasse 51, 8000 Munchen 70
(2) POB 830951, D-8000 Munich, FRG; Uta Grüneberg (Term-PC); Systèmes: MacroCAT ->, METAL ->, TEAM term bank; voir aussi University of TEXAS

**SHARP; Japan; Système: DUET ->

**SITE; France; Purchased B'VITAL 1990; Systèmes: CALLIOPE-AERO, CALLIOPE-INFO, CALLIOPE-RÉVISION -> en collaboration avec GETA

**SMART Communications Inc; fondé ?1972; 212/486-1894. Telex 220883 taur; 825 Third Av, 30th flr, POB 963, FDR, NY10022; Pres: John Smart. Linguist: Albert LaMothe; SMART Translator ->, SMART Expert Editor <MAX>

**SOCIÉTÉ CANADIENNE DE TRADUCTION ASSISTÉE <SOCATRA>; Fondée 1981; 514/735-7079, 6750; 4255 de Courtrai, Montreal H3S 1B8; Président: Claude Richaud; Système: XLT ->

**SOFTWARE DESIGN; Munich RFA; Système: TERM-LIDAS ->

**University of STUTTGART; Stuttgart, RFA; Systèmes: SEMSYN, ATLAS II ->

**SUMMER INSTITUTE OF LINGUISTICS <SIL>, Linguistics Coordinator - "IT" Registration; 214/298-3331; 7500 W Camp Wisdom Rd, Dallas TX 75236; Coordinator: Eugene Loos. Gary F Simons, Larry Versaw; Système: IT (traitement de texte interlinéaire)

**SYNTEC (SynTec) Gmbh; Stuttgart RFA; Système: CAT ->

**SYSTRAN TRANSLATION SYSTEMS <STS>; La Jolla CA, USA; Proprietors (except Japan) 1987; GACHOT; Président: Denis Gachot (fils de Jean Gachot). 100 employés; Système: SYSTRAN ->

---- Société SYSTRAN; 13-15, Rue Jean Pierre Sauvage, L2514 Luxembourg; M. Abd el Haqq

**SYSTRAN JAPAN; Japan; Système: Systran ->

=T

**TAO CANADA; Montréal, Canada; Distributeur de MicroCAT ->

**TAO INTERNATIONAL; France; French distributor of MacroCAT, MicroCAT ->

**TECHNICAL MARKETING CONSULTING; 1670/64422; Gagelweg 3, 4651 VL Steenbergen, Netherlands; Distributors for Multi-Lingual Scholar sa GAMMA

**TE CORP: 603/536-3300: VP: Linn H Downs: MT consultants

**TETRACOMM inc.
Coordonnées électroniques: tél. (819) 777-1011, fax 777-8876
Adresse postale: 84 Dumas #100, Hull Qc / CP 420, succ. A, Hull Qc J8Y 6P2, Canada
Directions: Benoît Thouin, (président
Importance: PME
Secteur: privé
Domaines: TAO - développement et consultation
Systèmes: MTX français ->

**University of TEXAS at Austin, Linguistics Research Centre <LRC>: 1961- : POB 7247, Austin, TX 78713-7247: Dir: W. P. Lehmann, Winfield S. Bennett: Système: METAL for Siemens 1978-

**THIBODEAU, Michel: 613/824-5211: 1799 Turnberry Road, Orléans, Ontario K1E 3V1, Canada: Système: PTT THIBODEAU ->

**University of TORONTO, Dept of Computer Science: 416/978-8747. Internet: gh@ai.toronto.edu: Toronto M5S 1A4, Canada: Pr. Graeme Hirst

**TOSHIBA: Japon: Systèmes: AS TRANSAC, ATTP ->

**TOVNA TRANSLATION MACHINES LTD: Israel. N. American distributor: TTI: Linguists: Daniel Cohen, Shalom Lapin: Système: TOVNA MTS ->

**TRADOS Gmbh: 711/627068, fax 616745: Rotebühlstrasse 87, D-7000 Stutgart 1, RFA: Systèmes: MULTITERM, TED, Text-Analyzer ->

**TRADUCTIX: Montréal, Canada: Président: Claude Bédard: Expert-conseil en TAO

**TRANSLATION TECHNOLOGIES INTERNATIONAL, Inc. <TTI>: 202/244-8500, fax 244-8165: 3007 Tilden Street NW, Washington DC 20008, USA: N. American distributor of TOVNA MTS

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**UKATS: (44)273/204543: 38 Ship St, Brighton BN1 1AB, UK: TERMEX sales

=V
**Bureau Marcel VAN DIJK: Bruxelles, Belgique: MT consultants

**VOLKSWRITER Ltd: Europe: Système: Volkswriter 3.2 ->. Distributes Collins electronic dictionaries

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**WANG CANADA Ltd: Ottawa, Canada: Associate of LOGOS

**WINDSOFT: (33)76/875601: Genoble, France: Kamel Gaddaf: Traitement de text arabe

**WINGER HOLDINGS A/S: Virum, Denmark: Système: WINGER 92 ->
"Winger... is a textile company which, in the process of computerising its own operations, became involved in software development."

[Kingscott]

**WORDPERFECT (WordPerfect) Corp: 801/222-4222, Tlx 820618, Fax 222-4277: 1555 N Technology Way, Orem, UT 84057, USA: Systèmes: WORDPERFECT ->

=X

**XEROX CORPORATION, Translation Services: Joseph C Webster Center for Technology, 780 Salt Rd, bldg 845-17S, Webster NY 14580: Mgr: Maria Russo: Systèmes: VIEWPOINT multilingual WP, ETHERNET communications network, Systran ->, Multinational Customized English «MCE»

---- XEROX Palo Alto Research Center «XEROX-PARC»: Martin Kay: Système: Experimental translator workstation

Appendix 4

Artificial Intelligence Research and Development Fund

Information for Companies and Universities

Strategic Technologies Planning Division, Technology Policy Branch
Industry, Science and Technology Canada

January 1990

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ARTIFICIAL INTELLIGENCE RESEARCH AND DEVELOPMENT FUND

Information for Companies and Universities

A.0 INTRODUCTION

The Artificial Intelligence Research and Development Fund is a recent initiative of Industry, Science & Technology Canada under the Department's Strategic Technologies Program. The Fund exists to encourage federal departments and agencies to develop AI systems and applications which will have high payoffs in terms of improved government productivity and effectiveness of operations. At the same time, this will increase the competitiveness of the private sector through the contracting-out of research and development, through the transfer of technology and know-how, and through collaboration in system implementation.

Only designated departments and agencies of the Government of Canada can apply to the Fund for support (see Section D.0 below).

The Fund will match the contributions of federal government departments and agencies for the development of AI systems. To be eligible, project proposals must involve the private sector through contracting-out or other forms of cooperative effort. While departments active in AI will have the most immediate interest, it is intended that the Fund will encourage investment in artificial intelligence in those departments and agencies that are not currently users of AI. This applies especially to departments and agencies which have been identified as having functions that could be improved through the application of this technology.

Approvals under this Fund will be made in advance with funds to be made available in the following fiscal year(s). A two-stage process for the review and evaluation of proposals has been established. This will consist of preliminary application, screening, final application, decision and release of funds as follows:

TIMETABLE

A.1 Sponsoring departments and agencies (sponsors) will be asked to make a preliminary application by Friday, March 15, 1991, which provides the basic information necessary to screen applications. This will make it possible to provide feedback to departments at an early stage. A decision will be forwarded to departments in May 1991.

A.2 There will be a second deadline, Friday, June 28, 1991, for departments to submit final proposals on projects that received preliminary approval at the initial screening stage.

A.3 Review of final applications will take place in September.

A.4 Project approvals will be made by the end of September. Funds will be made available to contractors in the next (April 1 to March 31) fiscal year.

The Preliminary Application is meant to ensure that the proposal meets the basic criteria of the Fund. That:

- *the proposal is an artificial intelligence project (see Section E.0);*
- *the project is likely to have significant impacts in terms of government productivity and/or capabilities as well as in terms of enhancing the competitiveness of the private sector;*
- *the project addresses one of the priority application areas (see Section F.0) or, if not in a priority area justification for the proposal must be made in, terms of the Fund's objectives and strategy (see Sections B.0, C.0, G.1);*
- *the majority of the work of the project (particularly the technology development) will be contracted-out to the private sector;*
- *the project sponsor(s) have assembled a team that has the prerequisite skills and time commitment to adequately manage the project; and*
- *the sponsor(s) has (have) indicated a significant commitment to the project in terms of cash contribution.*

Proposals that do not meet basic criteria will be screened-out completely in the preliminary review. The remainder, including those projects which show promise, but are in some way deficient, will be requested to submit a final application; applicants will be informed of such deficiencies at the time that they are informed of the decision of the Steering Committee on the preliminary applications and should respond to this in their final application.

The Final Application should provide full detail of projected technological milestones, cash flow of contributions from all sources, time profiles of contributions in kind as well as a full technical description of the project which indicates clearly how the artificial intelligence components will be developed and how they will be expected to function. Detail additional to that provided in the preliminary application should be provided on the expected impacts of the system on government operations and private sector competitiveness.

Review of final applications will be completed in September in time for departments to include the projects in their funding requests for the following fiscal year. Project funding would commence April 1 of the new fiscal year.

The preliminary application instructions follow the criteria of Section G.0 of this document. Final review will follow Section H.0. (See below).

B.0 OBJECTIVES

The objectives of the Fund are to:

B.1 Strengthen the capability and capacity of Canadian industry to supply artificial intelligence technology for industrial and social applications;

B.2 Improve the quality and productivity of government operations and services to the public; and

B.3 Enhance the competitiveness of the economy through the application of artificial intelligence technology.

Objective B.2 refers to such benefits as increased operational efficiency, cost savings, increase in productivity of personnel (especially specialized or highly qualified personnel).

C.0 STRATEGY

The strategy is to use the Federal Government as a test-bed to develop and subsequently apply artificial intelligence technology in innovative, risky applications which are expected to result in high payoffs in terms of enhanced government operations and services, as well as enhanced national competitiveness through contracting-out and technology transfer and application in the private sector. Federal departments and agencies will be required to contract-out R&D projects, thereby bringing together industry-led teams to develop both capability and capacity in the private sector. The Fund will be used to share project costs. Collaboration between departments in applications of common interest will be encouraged.

It is intended that resources from the Fund be used to contract out the development of artificial intelligence systems to profit-seeking private sector companies. However, other forms of private sector participation as well as contracting-out to universities, Crown corporations, provincial research organizations and others is not excluded and will be considered on a case-by-case basis. A principal consideration would be the contractor's plans for the exploitation of the technology developed as a result of the project.

Departments are encouraged to co-sponsor projects; under such circumstances, the Fund will contribute up to a maximum of 50 percent of eligible expenses, that is, up to matching the total contribution of the other departments and agencies.

When a financial contribution is obtained from the private sector for part of a project, the Fund will match up to what the sponsoring department or agency contributes, up to a maximum of 50 percent of eligible expenses; under no circumstances will the Fund contribute more than the total of sponsoring department(s) or agency(s) for a given project.

Projects that are selected for funding under the Canadian Space Agency's program on Strategic Technologies for Automation and Robotics (STEAR), will not be eligible for support under this Fund.

D.0 ELIGIBLE APPLICANTS

Departments and agencies designated to receive financial resources from the Fund are:

Agriculture Canada
Atomic Energy of Canada Limited
Correctional Service Canada
Department of Communications
Department of Fisheries and Oceans
Department of Justice
Department of National Defence
Department of Supply and Services
Employment and Immigration Canada
Energy, Mines and Resources Canada
Environment Canada
Indian and Northern Affairs Canada
Industry, Science and Technology Canada
Labour Canada
Ministry of State for Science and Technology
National Health and Welfare
National Research Council
Natural Sciences and Engineering Research Council
Public Service Commission
Public Works Canada
Revenue Canada
Royal Canadian Mounted Police
Secretary of State
Social Sciences and Humanities Research Council
Transport Canada

These are departments considered to be most likely candidates for the application of artificial intelligence systems. Other departments and agencies would be added as deemed necessary by the Steering Committee.

E.0 DEFINING ARTIFICIAL INTELLIGENCE

Artificial intelligence is a broad field.[1] Intelligence can be defined for present purposes with reference to the chess problem. It is estimated that the total possible number of board positions is something in the order of 10^{120}. Yet, a good chess player reduces the problem of deciding his next move to a much smaller number of choices, corresponding to what he considers to be his best options. Intelligence is, in essence the ability to solve otherwise unwieldy problems by limiting the search of solutions. The areas generally thought to encompass AI nowadays involve this task of "reduction" in various forms. These areas are: sensory, robotic and cognitive systems.

E.1 Sensory systems include machine vision, speech understanding, and to a smaller degree, mechanized tactile sense.

E.2 Robotic systems are machines that interact intelligently and purposefully with the surrounding physical world. Work on vision systems is crucial to progress in robotics.

E.3 Cognitive systems attempt to do some form of "thinking". These include expert systems, natural (i.e., human) language processing, planning systems, and learning (or tutoring) systems. Expert systems store and use specialized human knowledge in narrow domains (fields of knowledge). In addition, expert systems usually make use of advances in man-machine interface to provide a high degree of user-friendliness, that is, ease of use by personnel who are not necessarily computer experts. It is expected that many of the systems supported by this Fund will be expert systems.

To ensure that projects are truly artificial intelligence projects, they will have to demonstrate some characteristics related to at least one of the three areas described above for sensory, robotic or cognitive systems.

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[1] The following paragraph is largely based on Scientific American, Trends in Computing, Special Issue, Volume 1

F.0 AREAS OF APPLICATION

Initial priorities for the development and application of artificial intelligence under the Fund shall be:

F.1 The management and exploitation of renewable and non-renewable resources.

F.2 Natural language processing, including language translation.

F.3 Improving the safety and cost-effectiveness of the national transportation infrastructure.

F.4 The training and re-training of the workforce (intelligent tutoring systems).

These priorities may change over the lifetime of the Fund. The four initial priorities are interpreted as including the promotion of the health and safety of Canadians and protection of the environment. Criteria for defining these priorities will be the same as the criteria used in the assessment of proposals, namely the areas which are most likely to bring economic benefit to the federal government and help to strengthen the competitiveness of Canadian industry.

G.0 PREPARATION OF PROPOSALS

The full project proposal will be assessed against the criteria contained in the Section "Assessment of Proposals". However, each project sponsor is requested to prepare a preliminary proposal as based on the requirements of the present section. Sponsoring departments or agencies should use the preliminary application instructions provided to them for this purpose. The preliminary and final applications will be assessed and rated by the Steering Committee using the criteria of Sections G.0 and H.0 respectively. Project proposals must receive preliminary approval before the final proposal will be considered.

The cost of preparation of proposals and any other retroactive costs will not normally be eligible for support from the Fund.

The proposal of a sponsoring department or agency should:

G.1 Define the relevance of the project to the objectives and priorities of the Fund.

Relevance of the project to the objectives of the Fund should be identified with respect to both the Objectives and the Strategy. A key consideration will be the anticipated b nefits for government operations and private sector competitiveness, in terms of:

G.1.1 How the project will improve the quality, productivity and/or capabilities with respect to government operations and services to the public. This refers to the specific work or functions within the organization (division, branch, service or centre) that will use the AI system as well as in more general terms for the department or agency and for the federal government as a whole. The economic impact on the sponsoring department could include cost savings, increased efficiency or reliability, and/or other benefits;

G.1.2 How the project will enhance industrial competitiveness such as through technology transfer, the development of industry supply capabilities and industry-government collaboration in system applications; and

G.1.3 How the project will enhance the structural competitiveness of the economy. Two examples of this are the development and application of new technologies for training which will have widespread applications and generic systems which enhance the national capability to evaluate and manage natural resources.

As well, the project proposal should show how the project is related to at least one of the priority areas (see Areas of Application, Section F.0 above), or should provide an explanation as to why the project should receive support under the Fund, if it is not in one of the priority areas.

G.2 Define the technology targets to be attained through the project and the results expected.

The project proposal submitted by the sponsoring department or agency for review must include the following information:

G.2.1 How the project will lead to a system that works. The functionality that will be provided by the AI system should be specified;

G.2.2 How the project consists of the application of the best available technology and/or the use of leading-edge technology (that expands the frontiers of knowledge); and

G.2.3 Why the project is an artificial intelligence system. In other words, it must involve development of a sensory system (machine vision, speech understanding, or tactile sensing(, robotic system, or a cognitive system (expert system, natural language processing, planning system, learning system). In the case of an expert system, it must be clear that the purpose of the system is to apply expert human knowledge to dealing with a particular problem or set of problems.

G.2.4 A schedule of projected technological milestones.

G.3 Include plans for the contracting-out of the projects to industry, as well as the expected role of universities.

In order to receive support from the Fund, the proposed system development must involve the private sector.

The government's contracting regulations and procedures must be respected, in particular the principle of fair and equitable opportunity. Competition for private sector participation must be used, to the extent possible, to ensure equal access and reasonable prices. There are two basic approaches which departments should consider.

First, when departments originate the project and can define the requirement in advance, competitive proposals should be sought through the procedures established by the Department of Supply and Services (DSS). The normal services such as publicity, sourcing, soliciting proposals, evaluation, negotiation and contract management, can be obtained through DSS.

A second approach might involve departments identifying, in general terms, their areas of interest in the field of Artificial Intelligence (AI), publicizing these areas of interest and allowing the private sector to submit proposals with their ideas and interests. Again DSS can provide valuable services by helping to formulate an announcement, publicizing it, handling incoming proposals and establishing procedures which will facilitate the process.

In cases where the private sector initiates the contact (unsolicited) directly with a department, DSS should be consulted as early as possible to ensure that there will be no difficulty with justification of source selection at a later date.

For information on contracting procedures and notification of Requests for Proposals, potential contractors should contact:

Director (John Holinsky)
Science Branch
Science and Professional Services Directorate
Supply and Services Canada
(819) 956-1788

G.4 Contain a plan for the prototype testing and implementation of the system developed within the sponsoring department.

It is expected that most will be multi-year projects.

G.5 Set out how the project will be managed.

The project management structure should be described fully including the name of the official in the sponsoring department (the lead sponsoring department, where more than one are involved), who will have responsibility for managing the project, overseeing the contractor(s), etc.

The project proposal must contain a detailed timetable for the execution of the work. This timetable must include a written, summary report every six months, and a presentation once every year.

G.6 Identify the extent of technical expertise in the subject area within the sponsoring department.

In the case of an expert system, the project proposal should identify the knowledge domain expert (or experts), and indicate the time commitment(s) to the design and testing of the system.

H.0 ASSESSMENT OF PROPOSALS

The submissions of departments and agencies should be self-contained. However, the reviewers, at their discretion, can request the sponsor to make an oral presentation and/or be present to answer questions.

Final project proposals will be assessment against the following criteria:

H.1 Whether the project offers the potential for high productivity gain in government operations and/or very significant improvements in government capabilities or services to the public or other departments;

H.2 The extent to which the technology and/or applications to be developed are expected to also result in important productivity gains or competitiveness improvements in the private sector through the execution of the project;

H.3 Whether the project requires R&D which poses a significant technical risk or cost, and would not normally be undertaken;

H.4 The soundness of the project definition and objectives; and

H.5 The effectiveness of the proposed arrangements by which the project will be contracted-out to the private sector.

I.0 ELIGIBLE EXPENDITURES

Costs will be shared with departments, to a maximum to 50 percent of the eligible expenditures, for a given study or project. Eligible expenditures consist of:

I.1 Contracted R&D projects, to the point of producing a proof of concept prototype, but excluding product development.

Research and development which will lead to software, hardware, or a system that is already commercially available is not eligible.

I.2 Travel costs associated with the management of the project.

I.3 Feasibility studies which are needed, for example, to examine scientific merit, determine technical targets, define expected pay-back and impacts on industrial competitiveness, and plan the project phases.

I.4 Departmental training and essential costs for software testing and evaluation.

This applies to training of personnel of the sponsoring department who will be working on the project or other training related to achieving the goals set out in the project proposal.

I.5 Testing of prototype systems by the department(s) concerned.

I.6 Internal O&M costs associated with executing a portion of the R&D project intramurally, only in cases where it can be demonstrated, a priori that this arrangement will be essential to the success of the project. However, the Fund cannot be used to acquire indeterminate person-years.

Contributions of the sponsoring department might take the form of contributions in kind such as personnel or computer time, at cost. This includes the expert(s) in the particular knowledge domain for an expert system, and any other expert(s) who will directly participate in R&D or prototype testing and who contribution is essential to the project. Contributions of personnel should be valued for the amount of time to be devoted to the project at salary, plus to 25 percent.

Computer time is to be valued at cost.

I.7 Contractors undertaking R&D projects can purchase special equipment such as dedicated computers essential for the execution of the project.

The cost of equipment purchased by the sponsoring department or agency for use in the project being proposed is an eligible expense, up to a maximum of 25 percent of total eligible expenses. This may include computer software for the conduct of the project. An alternative and preferred approach would be for the private sector contractor to purchase the equipment and rent it to the sponsoring department or agency, at a rate to be negotiated by the two parties.

Equipment required beyond the prototype stage is not eligible. This might include, for example, the purchase of computers, terminals, etc., for more widespread implementation and access to the system.

J.0 PROJECT AND CONTRACT ADMINISTRATION

Project administration is the responsibility of the sponsoring department or agency, or the lead sponsoring department or agency.

Contract administration is the responsibility of the sponsoring department in conjunction with the Department of Supply and Services. In the case of a project involving more than one department or agency, then the lead department or agency is responsible for contract administration.

The sponsoring or lead department or agency is to report to the Steering Committee not less than once every six months, on progress in its project, including a report on whether the project is meeting the timetable originally set out in the project proposal or is meeting a revised timetable.

K.0 TREATMENT OF INTELLECTUAL PROPERTY RIGHTS

Current regulations stipulate that under a 100 percent government financed project, the intellectual property rights belong entirely to the Crown. However, the contractor and the sponsoring department, in conjunction with the Department of Supply and Services, as part of their overall contract negotiations, may negotiate the matter of intellectual property. Specifically, departments can, and are encouraged to, licence to the private sector, intellectual property resulting from an AI project supported by this Fund. The sponsoring department's project proposal should indicate how the department intends to handle intellectual property. Decisions on this matter are made on a case-by-case basis, and may require Treasury Board approval.

L.0 ENQUIRIES

Coordinator, AI R&D Fund
Technology Policy Branch
Industry, Science and Technology Canada
235 Queen Street
Ottawa, Ontario
K1A 0H5

TEL: Lorraine Raynes (613) 993-0303